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

Part 5: Coding of loader crane bodywork

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

Partie 5: Codage des grues de chargement

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO ISO/TC 22, *Road vehicles*, Subcommittee SC 15, *Interchangeability of components of commercial vehicles and buses*.

ISO 21308 consists of the following parts, under the general title *Road vehicles — Product data exchange between chassis and bodywork manufacturers (BEP)*:

— *Part 1: General principles (ISO/PAS)*

— *Part 2: Dimensional bodywork exchange parameters*

— *Part 3: General, mass and administrative exchange parameters*

— *Part 4: Mapping to STEP application protocol 239* [Technical Specification]

— *Part 5: Coding of loader crane bodywork*

Introduction

Based on the ISO BEP system for coding of bodywork exchange parameters, this part of ISO 21308 specifically deals with the coding of dimensions and other characteristics of loader cranes. The aim is to ensure an efficient and unambiguous communication of dimensional installation data between the parties involved. The BEP coding covers also main characteristics of hydraulic, electrical, and electronic interfaces to the vehicle. XML coding for communication of the related BEP data is included as well.

This part of ISO 21308 is useful for all parties involved in the installation of cranes to vehicles, e.g. loader crane manufacturers, truck chassis manufacturers, and bodywork manufacturers.

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

Part 5:
Coding of loader crane bodywork

1 Scope

The ISO 21308 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 manufacturers,

— chassis importers,

— chassis dealers,

— one or more bodywork manufacturers, and

— bodywork component suppliers, e.g. manufacturers of demountable bodies, cranes and loading equipment, and tipping equipment.

This part of ISO 21308 specifically describes the coding dimensions and other characteristics of loader cranes and auxiliary stabilizers, to ensure an efficient and unambiguous communication of installation data between the parties involved.

This part of ISO 21308 covers loader cranes as specified in ISO 15442, designed to be fitted on commercial vehicles (including trailers).

This part of ISO 21308 is not applicable to other load-lifting systems (e.g. tail lifts, hook loader systems).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/PAS 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*

EN 12999, *Cranes — Loader cranes*

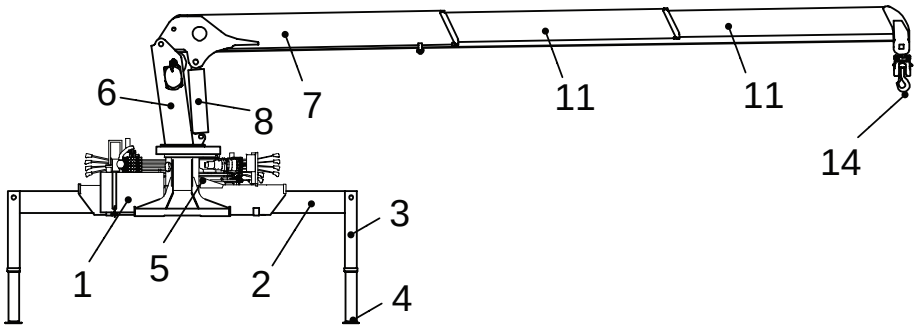
3 Terms and definitions

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

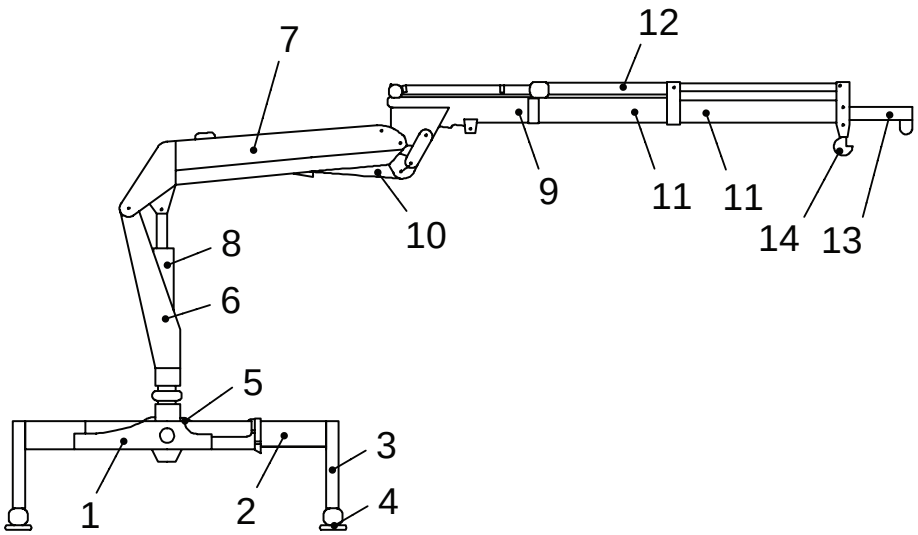
3.1
loader crane
powered crane comprising of a column that slews about a base and a boom system that is attached to the top of the column and which is usually fitted on a vehicle (including trailer) and designed for loading and unloading the vehicle

[SOURCE: ISO 15442:2005, 3.1.1, modified — Note 1 to entry has been extended.]

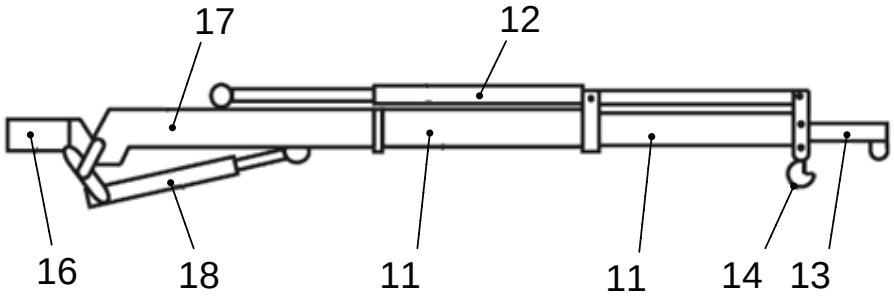
Note 1 to entry: Figure 1 shows the main parts of a loader crane referred to in this part of ISO 21308.



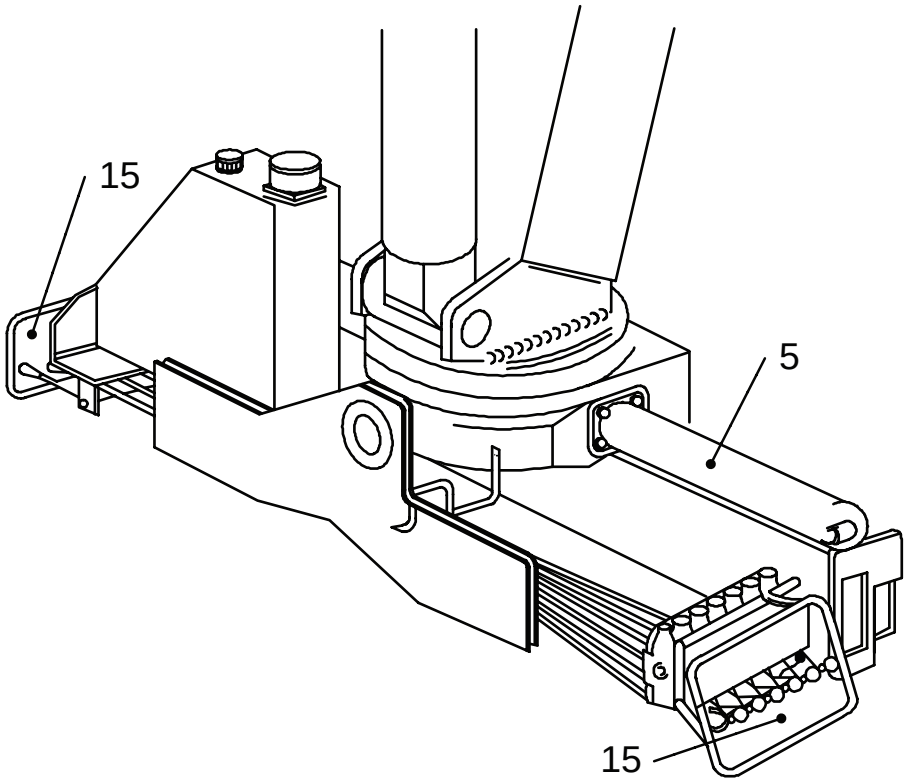
a) Loader crane with straight boom



b) Loader crane with articulated boom



c) Third boom details



d) Crane base details

Key

1	crane base	7	first boom	13	boom extension, manual
2	stabilizer extension	8	first boom cylinder	14	hook
3	stabilizer leg	9	second boom	15	controls
4	stabilizer foot	10	second boom cylinder	16	third boom adapter
5	slewing mechanism	11	boom extension, hydraulic	17	third boom
6	column	12	extension cylinders	18	third boom cylinder

Figure 1 — Main parts of a loader crane

3.2
articulated boom
boom consisting of members that pivot in the vertical plane

[SOURCE: ISO 15442:2005, 3.1.2]

3.3
crane base
base
housing incorporating anchoring points and bearings for the slewing column

3.4
boom
structural member in the boom system of the loader crane

3.5
boom extension
part of the boom which is capable of telescopic movement to vary its length

3.6
boom system
complete system consisting of booms, boom extensions, cylinders, and all accessories fixed to booms or boom extensions

3.7
column
slewing structural member which supports the boom system

[SOURCE: ISO 15442:2005, 3.1.6]

3.8
control station
position from which the loader crane may be operated

[SOURCE: ISO 15442:2005, 3.1.7]

3.9
control system
interface between the operating levers and the actuating components which provide movements of the loader crane

[SOURCE: ISO 15442:2005, 3.1.8]

3.10
dead loads
forces due to masses of fixed and movable crane parts (including fluids) which act permanently on the structure while the crane is being used

[SOURCE: ISO 15442:2005, 3.1.10, modified — "(including fluids)" has been added]

3.11
gross load
sum of payload, lifting attachments, and, if applicable, a portion of the hoist rope

3.12
hoist
machine for lifting and lowering suspended loads over predetermined distances using ropes or chains

3.13
load attachment point
point for attachment of means to lift a load

Note 1 to entry: There may be several load attachment points on a boom system.

3.14
mass point
mass given, together with the corresponding Cartesian coordinate

3.15
net lifting moment
rated capacity multiplied by outreach

3.16
nominal extended working position
working position with the first boom at the angle of its maximum moment and, if applicable, with the second and the third boom in the horizontal plane with all extensions fully extended, or if needed at a higher first boom angle to bring the second boom in balance

Note 1 to entry: In balance means that the second boom cylinder is able to hold at least the same payload as the first boom cylinder.

3.17
nominal retracted working position
working position wherein boom angles are as in nominal extended working position, with all boom extensions fully retracted

3.18
nominal slewing angle
slewing angle when the second boom system is in parallel with the local *x*-axis

3.19
nominal unfolded transport position
position wherein the boom system is in the horizontal plane with all extensions fully retracted

Note 1 to entry: The maximum overall transport height for the applicable country or region should be taken into account.

3.20
outreach
horizontal distance between the axis of rotation of the column and the point of load attachment

3.21
payload
load which is lifted by the crane and suspended from the non-fixed load-lifting attachment(s) or, if such an attachment is not used, directly from the fixed load-lifting attachment(s)

3.22
slewing
rotational movement of the column and boom system about a vertical axis

3.23
slewing centre
rotation centre of the crane column about a vertical axis

3.24
slot
linear range between two end points in the x-y plane where frame attachments can be positioned

3.25
stabilizer
aid to the supporting structure connected to the base of the crane or to the vehicle to provide stability, without lifting the vehicle from the ground

[SOURCE: ISO 15442:2005, 3.1.29]

3.25.1
stabilizer extension
part of the stabilizer capable of extending the stabilizer leg laterally from the transport position to the operating position

[SOURCE: ISO 15442:2005, 3.1.30]

3.25.2
stabilizer leg
part of a stabilizer capable of contacting the ground to provide the required stability

Note 1 to entry: The stabilizer leg is capable of extending the stabilizer foot in order to make contact with the ground.

[SOURCE: ISO 15442:2005, 3.1.31, modified — Note 1 to entry has been added.]

3.25.3
stabilizer beam
part of the base where the stabilizers are attached

3.25.4
stabilizer foot
part of a stabilizer leg in contact with the ground

3.26
total lifting moment
sum of the load moment and the moment produced by dead loads

[SOURCE: ISO 15442:2005, 3.1.34]

4 Coding principles

4.1 BEP codes of loader cranes

Each characteristic, related to the loader cranes and their 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 (this part of ISO 21308)
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 M = mass (m), or mass point (m,x,y,z) F = force (static or dynamic) T = moment (static or dynamic) R = radius V = angle 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	Not used in this part of ISO 21308

NOTE 1 Dimensions, except for radius, can be positive or negative.

NOTE 2 This part of ISO 21308 contains BEP codes for coding one loader crane on one truck. More cranes can be applied to the same truck by applying independent instances of coding.

4.2 Units of BEP code values

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

— dimensions (L, W, H, R) and coordinates (x,y,z), in millimetres (mm);

— masses, in kilograms (kg);

— forces, in newtons (N), or kilonewtons (kN);

— moments, in newton-metres (N·m), or kN·m;

— angles, in degrees (°).

NOTE Guidance on units is shown in the unit column.

4.3 References for measurements

4.3.1 Global coordinate system (X,Y,Z)

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

Origin is on top of the chassis frame, straight above the first front axle, and at the chassis centre line.

NOTE The vehicle coordinate system used in this part of ISO 21308 is fully in line with ISO 4130, but applied on a truck.

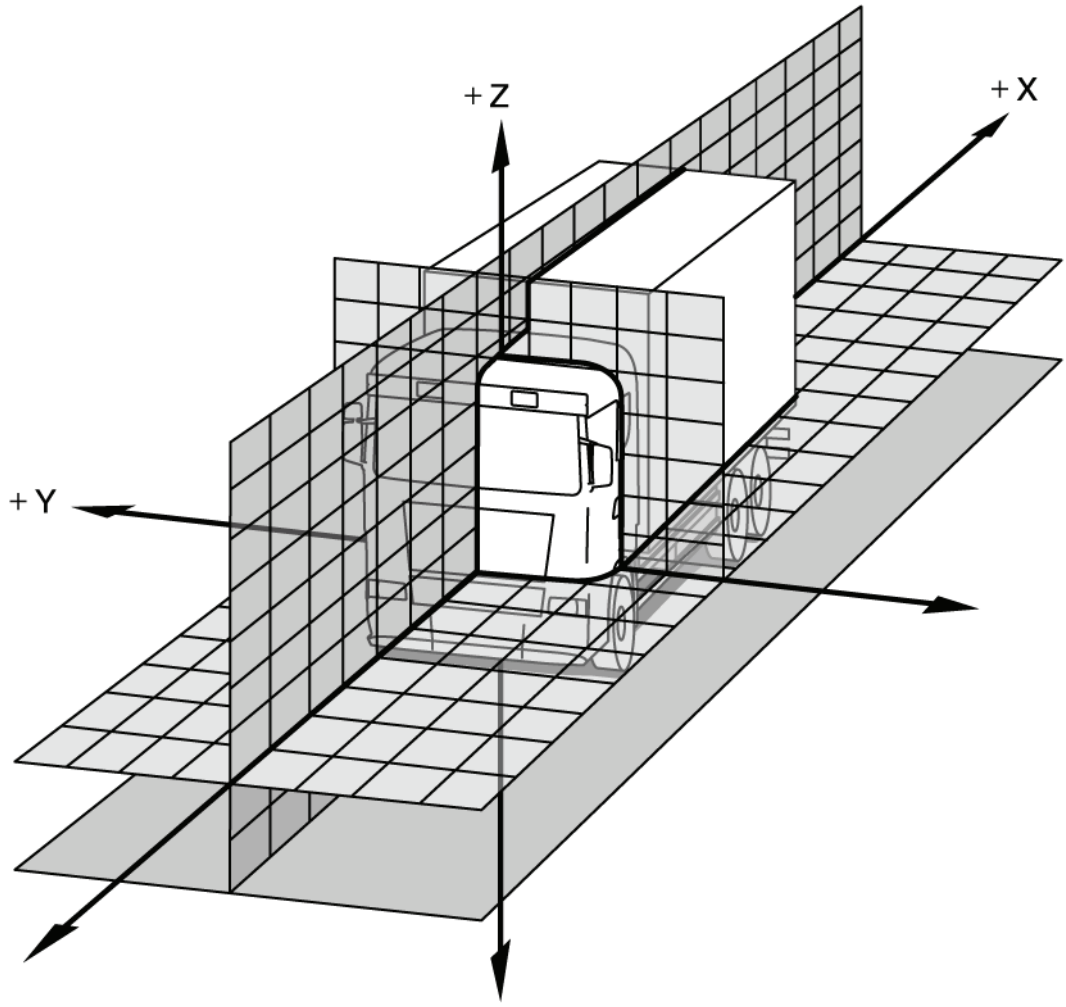


Figure 2 — Vehicle coordinate system according to ISO 4130, applied on a truck (commercial vehicle)

4.3.2 Local crane coordinate system

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

Figure 3 — Local crane coordinate system, general principle

The origin of the crane coordinate system (referred to as zero point in this part of ISO 21308) is the point where the crane slewing axis intersects with the mounting plane of the crane.

According to EN 12999, the longitudinal position (local x = 0) of the slewing centre shall be clearly marked on both sides of the crane base.

The crane orientation with respect to the positioning of boom system and stabilizers can be orientated according to either of the principles shown in Figure 4. The default crane orientation can be either of the two cases shown in Figure 4.

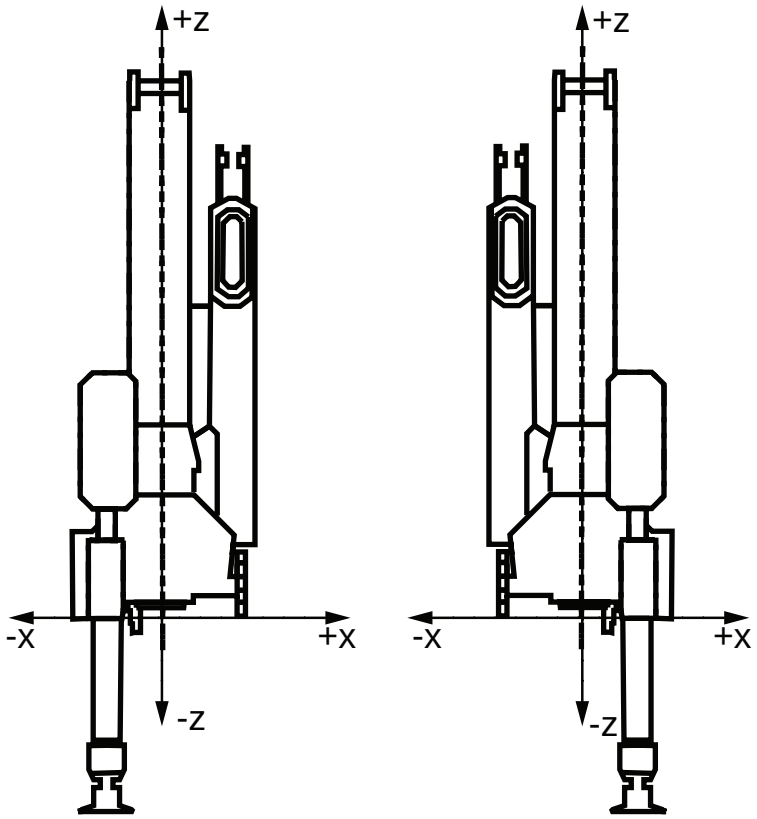


Figure 4 — Loader crane orientation with respect to positioning of boom system and stabilizers

The crane manufacturer decides the most appropriate orientation of the crane coordinate system in line with the conventions given above.

4.3.3 Local auxiliary stabilizer coordinate system

For a default mounting position, the principle should be that the auxiliary stabilizer coordinate directions should coincide with those of the vehicle. Local auxiliary stabilizer coordinates are denominated x, y, and z (lowercase letters). See Figure 5.

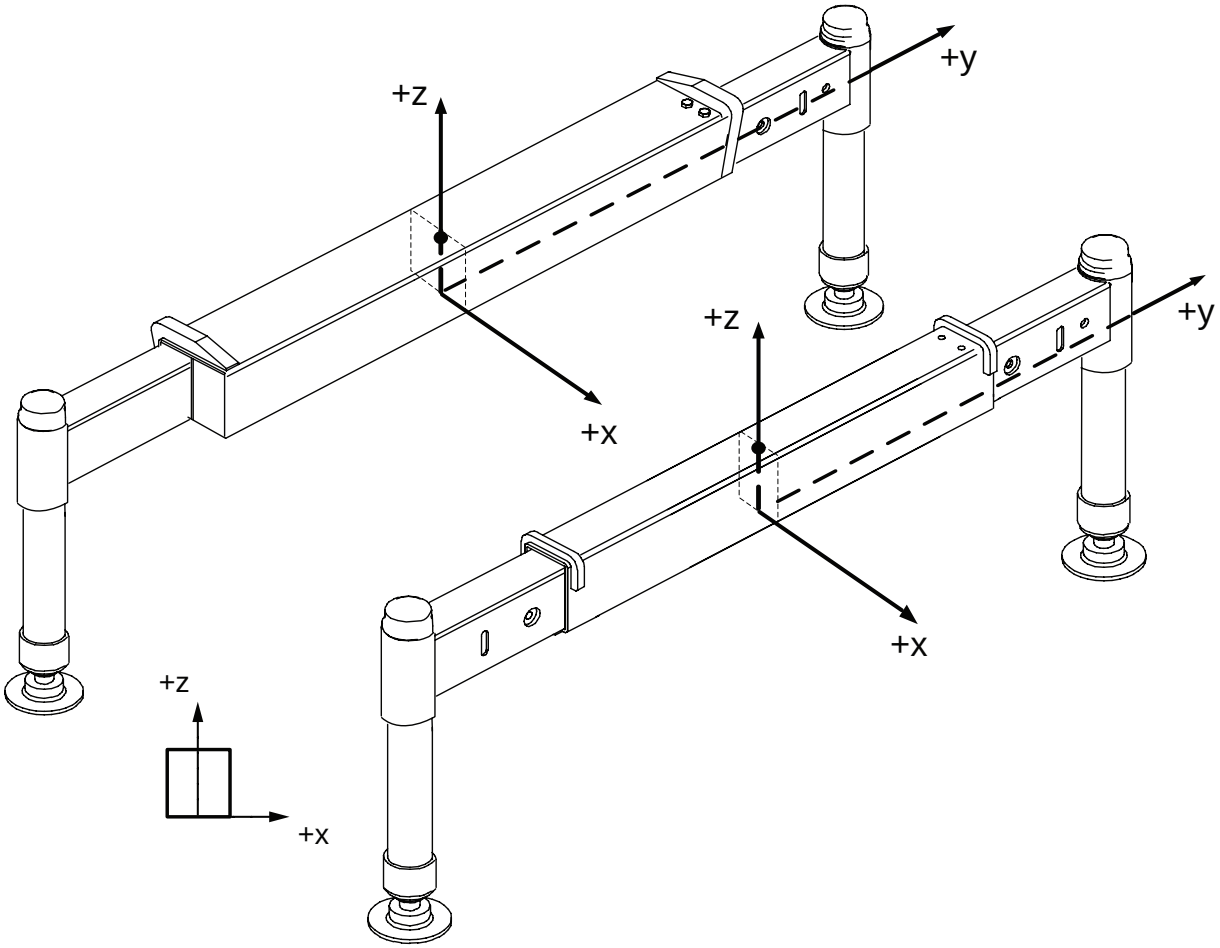


Figure 5 — Local stabilizer coordinate system, general principle

The origin of the auxiliary stabilizer coordinate system (referred to as zero point in this part of ISO 21308) is defined by the following:

— local x =0:, centre of stabilizer extensions for in-line extensions, centre between stabilizer extensions for off-centre stabilizer extensions;

— local y = 0: at half of the width of the stabilizer beam;

— local z = 0: at the lower mounting plane (used when stabilizers are mounted on top of chassis frame).

The orientation of the *x*-axis may be as shown in Figure 5 or in the reverse direction. The manufacturer decides the most appropriate orientation of the auxiliary stabilizer coordinate system with respect to the direction of the *x*-axis.

4.3.4 Transformation of local coordinates for loader cranes

Loader cranes and auxiliary stabilizers may be mounted in various positions (e.g. behind cabin, or at the rear) and with different orientations.

When the loader crane is mounted on a vehicle, its local coordinate system needs to be transformed to the directions of the global coordinate system. The transformed coordinates are x', y', and z' (lowercase letters with an apostrophe). See Figure 6.

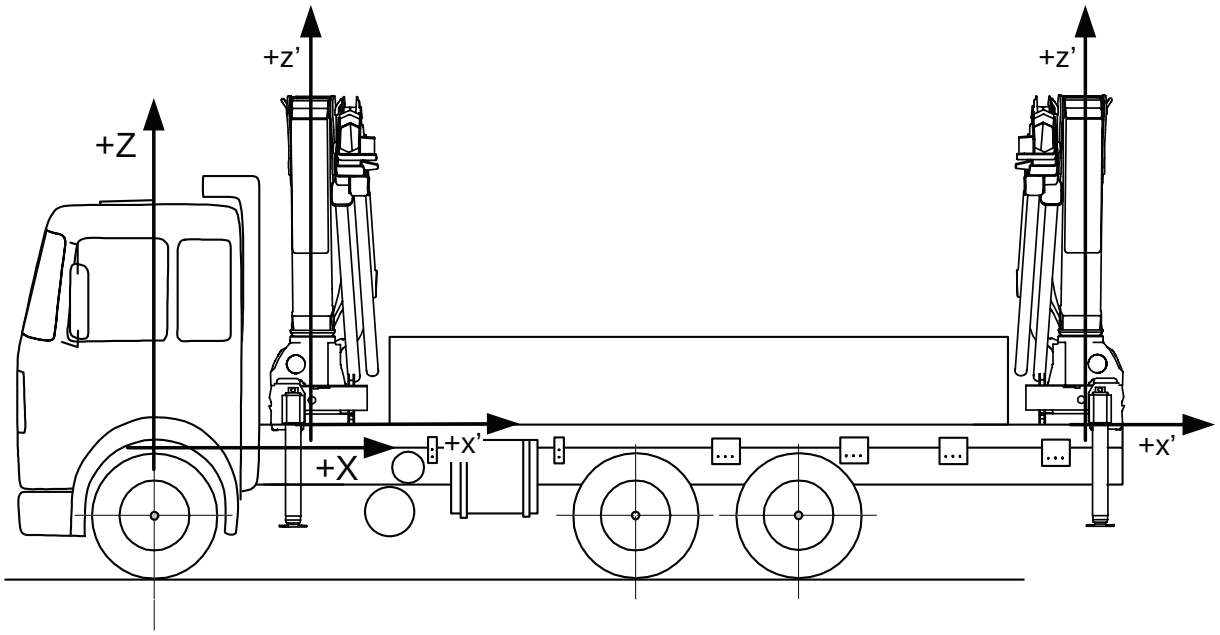


Figure 6 — X and Z coordinates of chassis and corresponding x' and z' coordinates of mounted loader cranes

The following transformations are required for the loader crane.

First the local coordinate axes must be aligned with the axes of the global coordinate system. One of the two following cases applies.

1) The loader crane is positioned according to the manufacturer's default orientation.

— x' = x

— y' = y

— z' = z

2) The loader crane is rotated 180° around the *z*-axis from the manufacturer's default orientation (the stabilizers now point to the opposite direction).

— x' = -x

— y' = -y

— z' = z

Then the loader crane can be described in the global coordinate system, when the offset to the mounting point is added to all coordinates of the local coordinate system.

Transformation to the global coordinate system, using coding as described in ISO 21308-2, is as follows.

— X = x' + BEP-01L001

— Y = y' + BEP-01W001

— Z = z' + (chassis height + sub-frame height) at (X,Y)

NOTE Chassis height is derived from BEP-H035 to BEP-H040. Sub-frame height is derived from BEP-H070.

4.3.5 Transformation of local coordinates for auxiliary stabilizer beams

The following transformations are required for each auxiliary stabilizer beam.

First, the local coordinate axes must be aligned with the axes of the global coordinate system. One of the two following cases applies.

1) The auxiliary stabilizer beam is positioned according to the manufacturer's default orientation.

— x' = x

— y' = y

— z' = z

2) The auxiliary stabilizer beam is rotated 180° around the *z*-axis from to the manufacturer's default orientation.

— x' = -x

— y' = -y

— z' = z

Then the auxiliary stabilizer beam can be described in the global coordinate system, when the offset to the mounting point is added to all coordinates of the local coordinate system.

Transformation to the global coordinate system, using coding as described in ISO 21308-2:

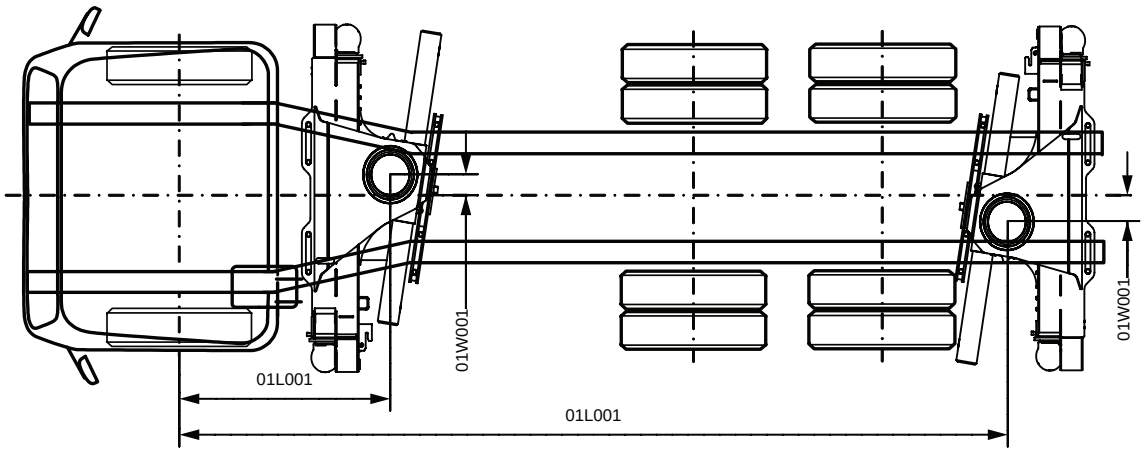
— X = x' + BEP-01L003.n

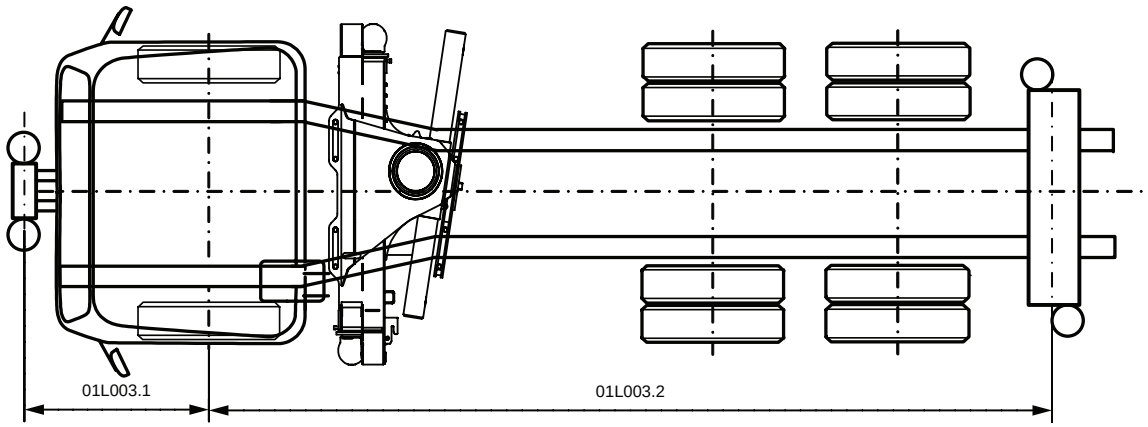
— Y = y'

— Z = z' + (height of lower mounting plane of auxiliary stabilizer beam when mounted)

5 Coding of geometrical data and space requirements

5.1 Mounting positions of crane and auxiliary stabilizers

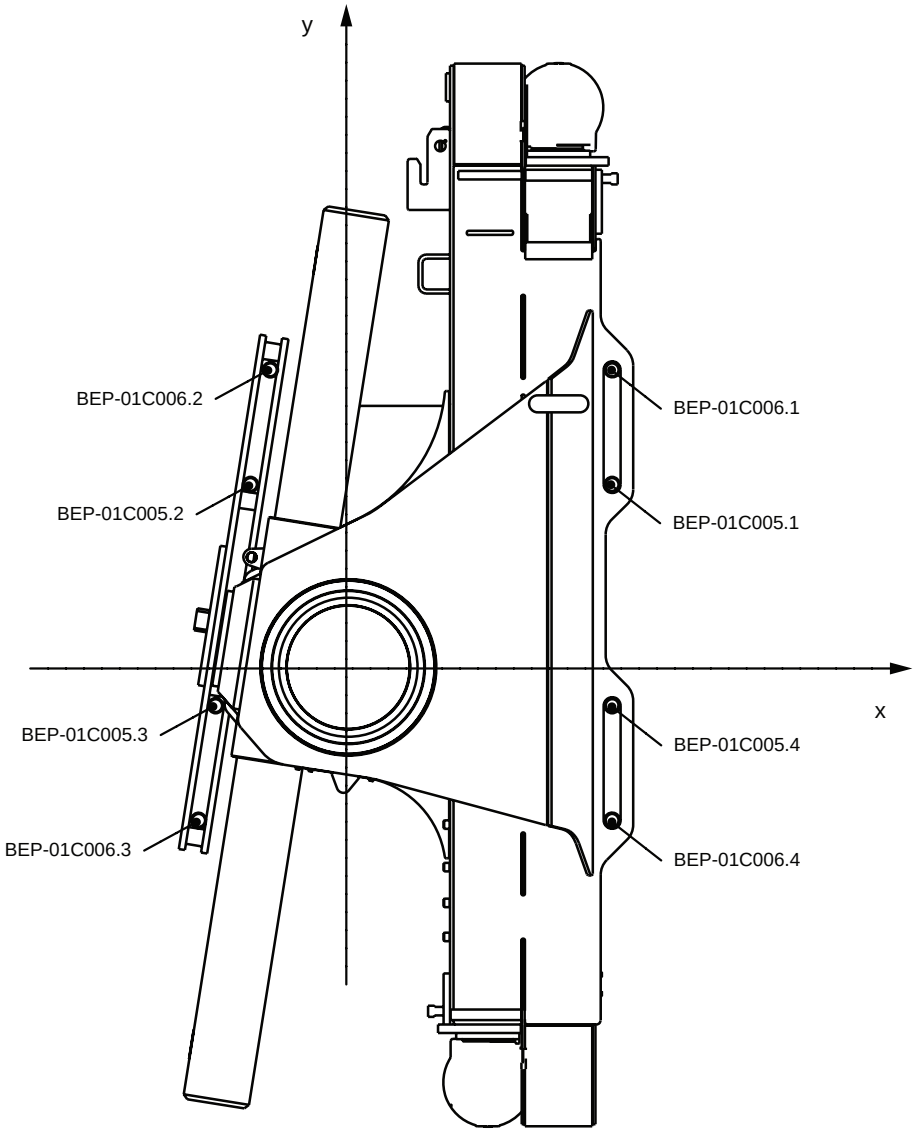
BEP-code	Assignment	Description	Unit	Presented in
BEP-01L001	Crane positioning point, length	Distance from first front axle to zero point of crane.	mm	2D, 3D, TD
BEP-01W001	Crane positioning point, width	Distance from centre line of chassis to zero point of crane. NOTE Rear crane example shows a distance with a negative sign.	mm	2D, 3D, TD
BEP-01V001	Crane orientation	Installed orientation of loader crane relative to manufacturer's default orientation. NOTE Only 0° or 180° is possible. If the code is omitted, the default orientation is assumed.	°	2D, 3D, TD
				
Example showing two crane mounting positions				
BEP-01L003.n	Positioning of n-th auxiliary stabilizer	Distance from first front axle centreline of the n-th auxiliary stabilizer or n-th group of stabilizers. NOTE Positioning in front of the front axle is noted with a negative sign.	mm	2D, 3D, TD
BEP-01V003.n	Orientation of n-th auxiliary stabilizer	Installed orientation of n-th auxiliary stabilizer relative to manufacturer's default orientation. NOTE Only 0° or 180° is possible. If the code is omitted, the default orientation is assumed.	°	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
				
Example showing front and rear auxiliary stabilizers				

5.2 Dimensional interfaces for connections to sub-frame and chassis

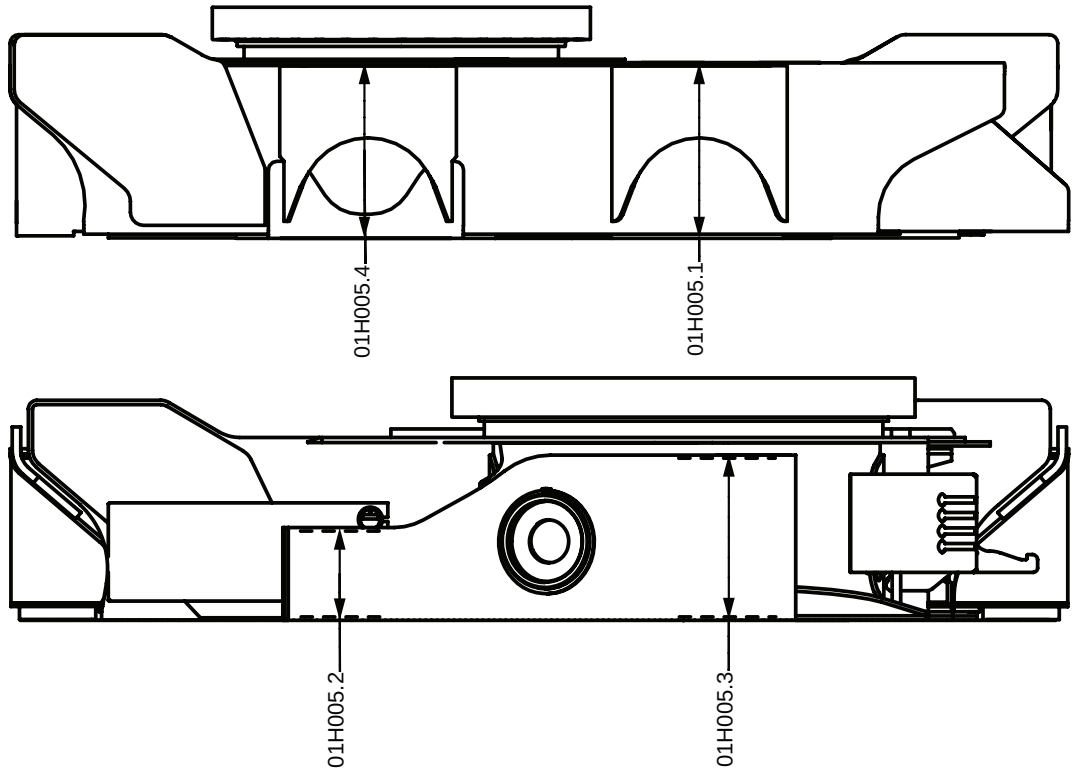
BEP-code	Assignment	Description	Unit	Presented in
BEP-01C005.p	Slot p, first end point	Coordinate (x,y) of first end point of attachment slot p. NOTE 1 The slots may be given in any order. NOTE 2 If a slot consists of a single hole, C006 can be omitted. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 Local coordinate system is applied (z = 0).	mm	2D, 3D, TD
BEP-01C006.p	Slot p, second end point	Coordinate (x,y) of second end point of attachment slot p. NOTE 1 The slots may be given in any order. NOTE 2 If a slot consists of a single hole, C006 can be omitted. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 Local coordinate system is applied (z = 0).	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in



Example of coding of four attachment slots

BEP-code	Assignment	Description	Unit	Presented in



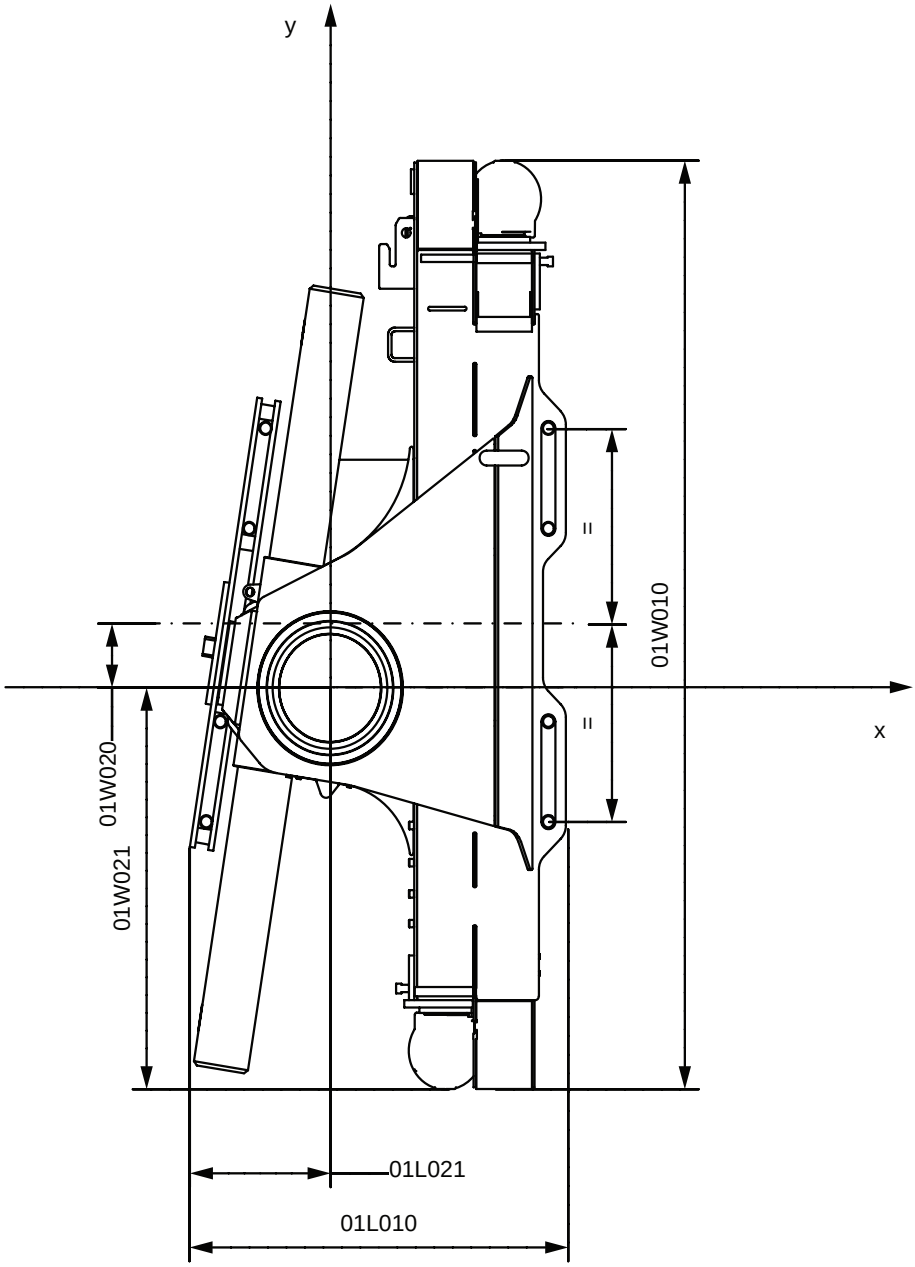
Example of height coding of slots 1 and 4 (upper) and slots 2 and 3 (lower)

5.3 Crane base dimensions, stabilizers, and lower space requirements

5.3.1 Crane base dimensions

5.3.1.1 Crane base, basic non-frame-integrated type

BEP-code	Assignment	Description	Unit	Presented in
BEP-01L010	Overall length, base	Overall length of crane base, above mounting plane, including stabilizers.	mm	2D, 3D, TD
BEP-01W010	Overall width, base	Overall width of crane base, including stabilizers.	mm	2D, 3D, TD
BEP-01W020	Slewing centre offset	Offset from slewing centre to symmetry line of the crane attachments. NOTE When the value is negative, the symmetry line is in the negative direction.	mm	2D, 3D, TD
BEP-01L021	Slewing centre to min x	Distance from slewing centre to the minimum x coordinate of the crane base.	mm	2D, 3D, TD
BEP-01W021	Slewing centre to min y	Distance from slewing centre to the minimum y coordinate of the crane base.	mm	2D, 3D, TD

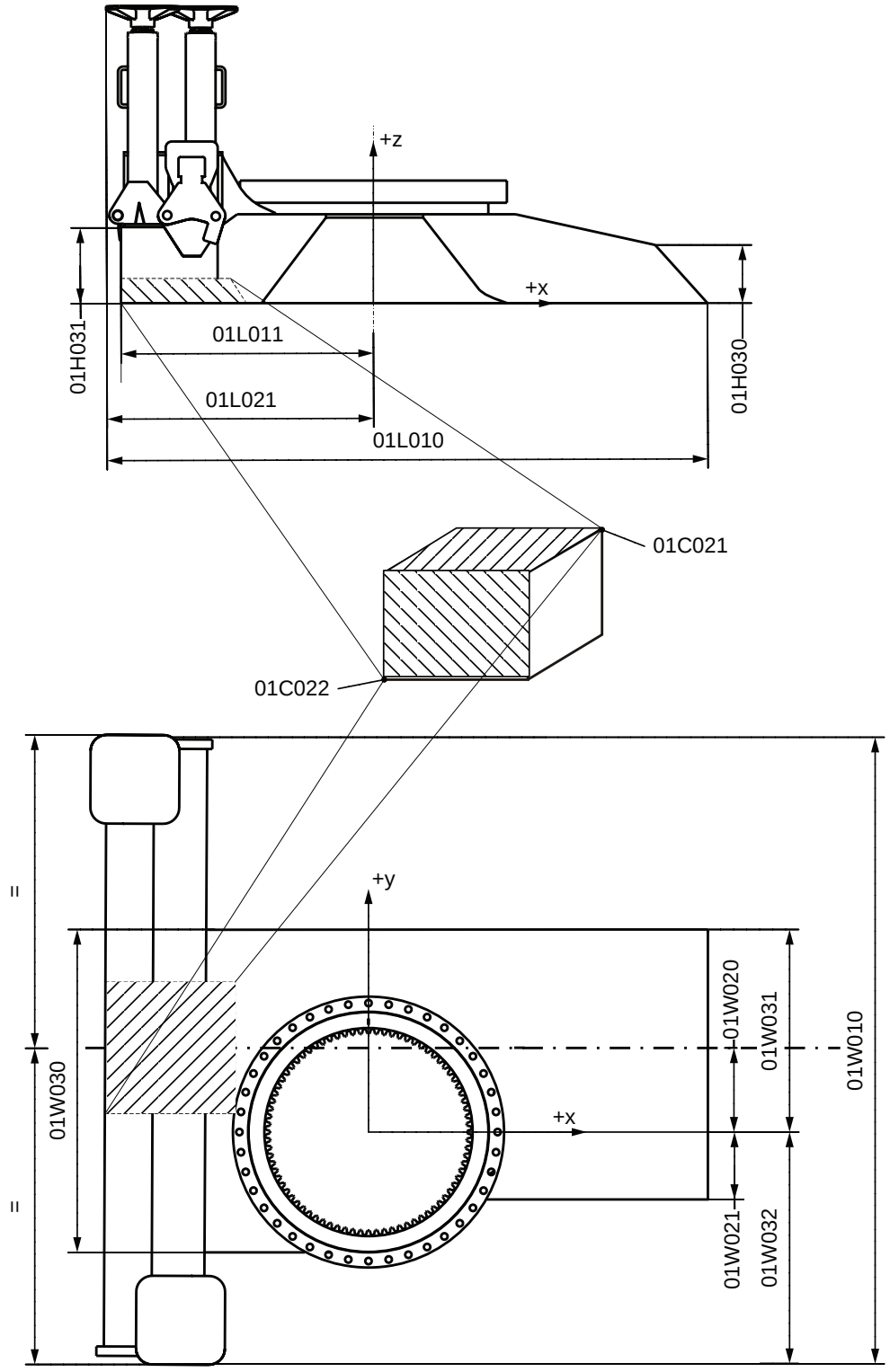
BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of a crane base				

5.3.1.2 Crane base, frame-integrated type

BEP-code	Assignment	Description	Unit	Presented in
NOTE The applicable codes for a regular crane base (see 5.3.1.1) should be used as far as possible, but additional coding may be necessary, as shown below.				
BEP-01L010	Overall length, base	Overall length of integrated crane base, above mounting plane, including stabilizers.	mm	2D, 3D, TD
BEP-01W010	Overall width, base	Overall width of integrated crane base, above mounting plane, including stabilizers.	mm	2D, 3D, TD
BEP-01L011	Slewing centre to min x of base	Distance from slewing centre to the minimum x coordinate of the integrated crane base to connect the additional sub-frame.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01W020	Slewing centre offset	Offset from slewing centre to symmetry line of the crane attachments. NOTE When the value is negative, the symmetry line is in the negative direction.	mm	2D, 3D, TD
BEP-01L021	Slewing centre to min x	Distance from slewing centre to the minimum x coordinate of the outmost point of the integrated crane base.	mm	2D, 3D, TD
BEP-01W021	Slewing centre to min y	Distance from slewing centre to the minimum y coordinate of the crane base without stabilizer.	mm	2D, 3D, TD
BEP-01W030	Overall width, base, without stabilizer	Overall width of integrated crane base, above mounting plane, without stabilizers to direction –x. NOTE Plane to connect crane base to the chassis.	mm	2D, 3D, TD
BEP-01W031	Overall width, base, without stabilizer	Overall width of integrated crane base, above mounting plane, without stabilizers to direction +x. NOTE Plane to connect crane base to the chassis.	mm	2D, 3D, TD
BEP-01W032	Overall width, base, without stabilizer	Distance from slewing centre to the minimum x coordinate of the crane base, including stabilizers. NOTE Plane to connect crane base to the chassis.	mm	2D, 3D, TD
BEP-01H030	Height of crane base from mounting plane	Distance from mounting plane to the highest point of the crane base to connect the additional subframe to direction –x.	mm	2D, 3D, TD
BEP-01H031	Height of crane base from mounting plane	Distance from mounting plane to the highest point of the crane base to connect the additional subframe to direction +x.	mm	2D, 3D, TD
BEP-01C021.p	Space requirement box p, first corner	Coordinate (x,y,z) of first corner of space enclosing box p. NOTE 1 The boxes may be given in any order. NOTE 2 Any two corners of a space diagonal may be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p may be omitted if there is only one box.	mm	2D, 3D, TD
BEP-01C022.p	Space requirement box p, second corner	Coordinate (x,y,z) of second corner of space enclosing box p. NOTE 1 The boxes may be given in any order. NOTE 2 Any two corners of a space diagonal may be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p may be omitted if there is only one box.	mm	2D, 3D, TD

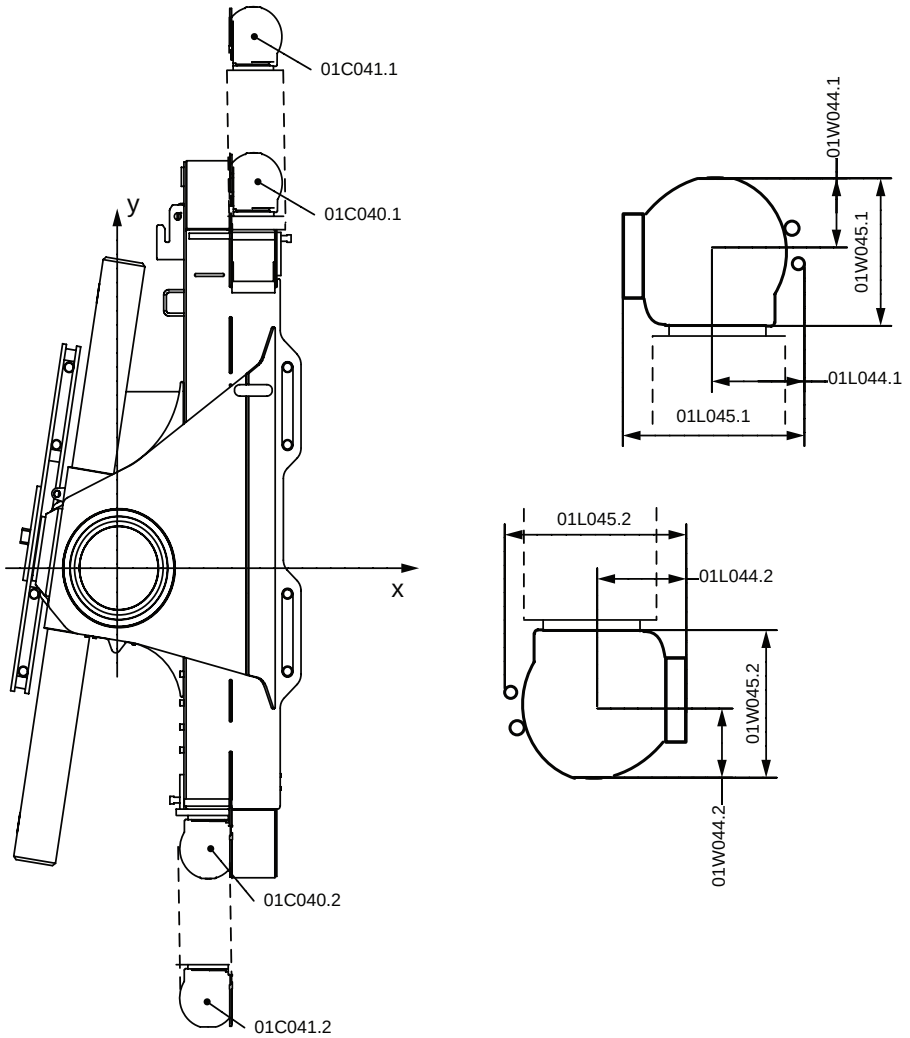
BEP-code	Assignment	Description	Unit	Presented in



Example of coding of a frame-integrated crane base

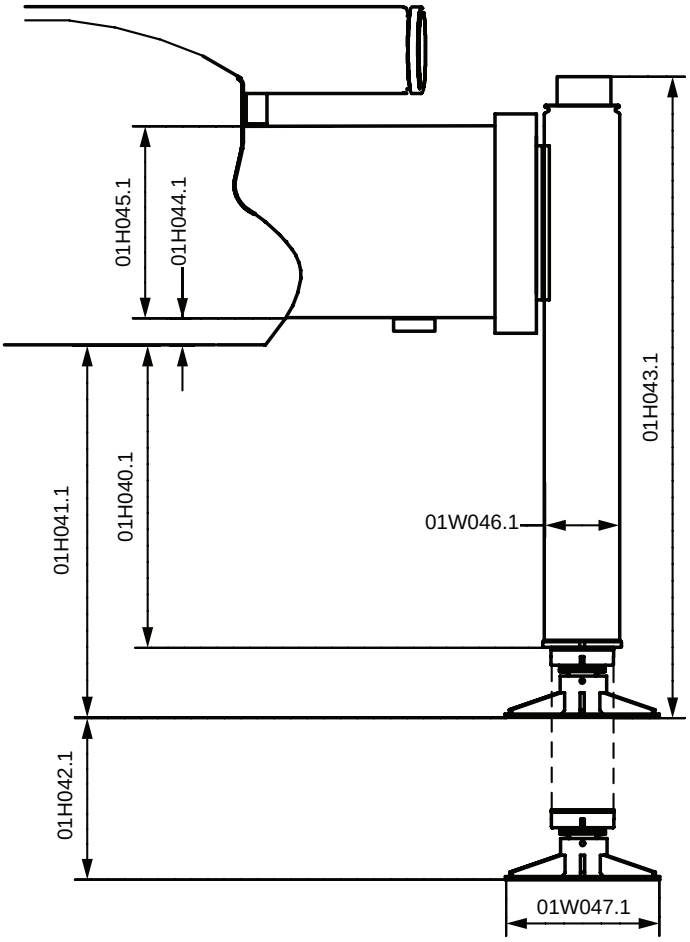
5.3.2 Main stabilizers, dimensions, and positions

BEP-code	Assignment	Description	Unit	Presented in
NOTE All codes mentioned in 5.3.2 are grouped together by applying the same value for .p.				
BEP-01C040.p	Stabilizer leg, transport position	Coordinate (x,y) of leg p of stabilizer in transport position. NOTE 01C040.1 is the coordinate of the first stabilizer leg in transport position.	mm	2D, 3D, TD
BEP-01C041.p	Stabilizer leg, extended position	Coordinate (x,y) of leg p of stabilizer in maximum extended position.	mm	2D, 3D, TD
BEP-01W044.p	Distance stabilizer leg centre to edge	Distance from centre axis of stabilizer leg p to outermost edge of stabilizer leg p, excluding stabilizer foot.	mm	2D, 3D, TD
BEP-01W043.p	Stabilizer leg overall width	Overall width of stabilizer leg p, excluding stabilizer foot but including sensors, hydraulic valves, and other components.	mm	2D, 3D, TD
BEP-01L044.p	Distance stabilizer leg centre to edge	Distance from centre axis of stabilizer leg p to outermost edge of stabilizer leg p in the +x direction, excluding stabilizer foot.	mm	2D, 3D, TD
BEP-01L045.p	Stabilizer leg overall horizontal length	Overall horizontal length of stabilizer leg p, excluding stabilizer foot but including sensors, hydraulic valves, and other components.	mm	2D, 3D, TD



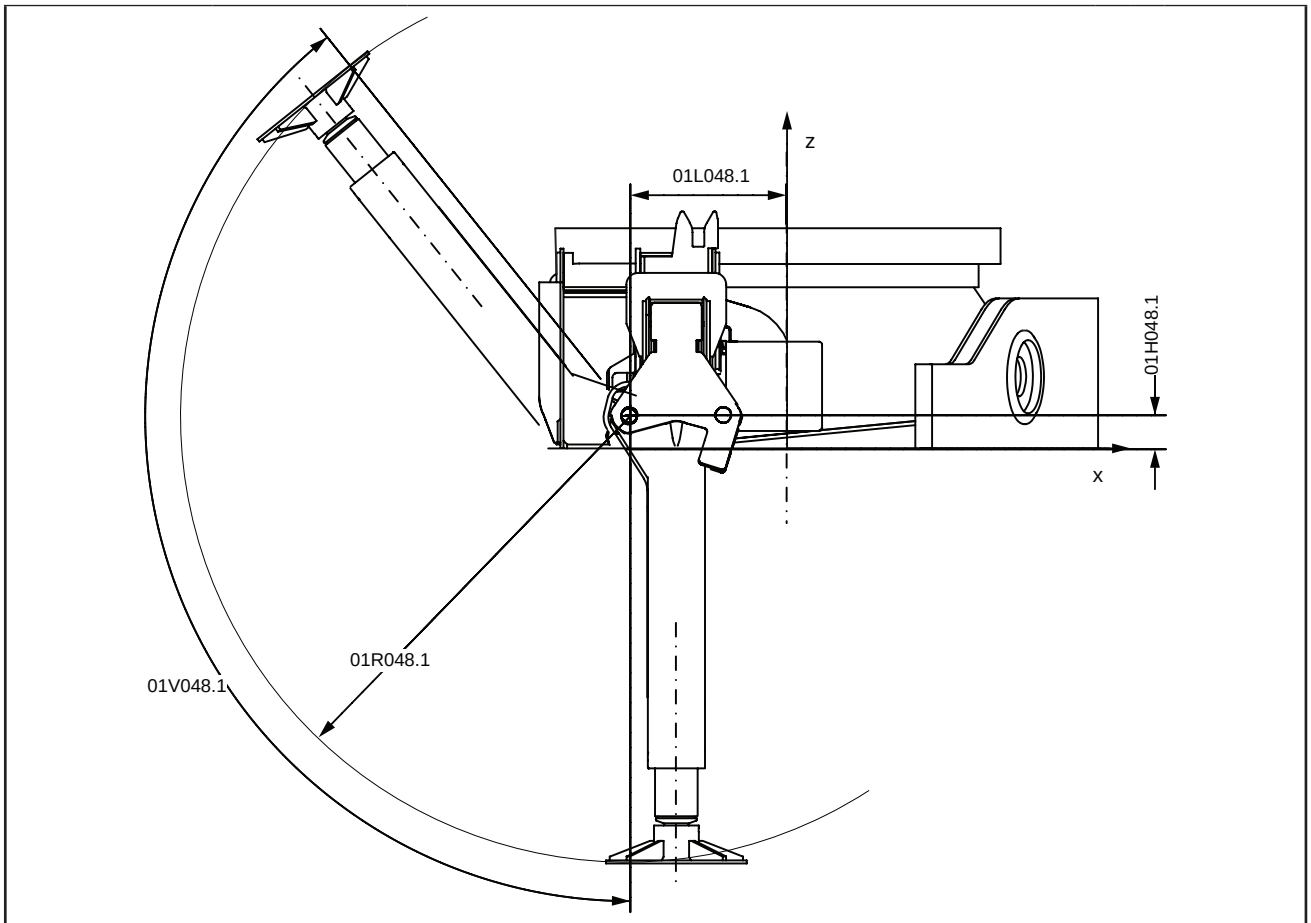
Example of coding of main stabilizers				
BEP-01H040.p	Stabilizer leg distance to mounting plane	Distance between mounting plane and lowest edge of non-extendable part of stabilizer leg p.	mm	2D, 3D, TD
BEP-01H041.p	Stabilizer leg distance to mounting plane, including foot	Distance between mounting plane and lowest edge of non-extendable part of stabilizer leg p, including foot.	mm	2D, 3D, TD
BEP-01H042.p	Stabilizer leg stroke	Maximum stroke of extendable part of stabilizer leg p.	mm	2D, 3D, TD
BEP-01H043.p	Stabilizer leg height	Minimum height of stabilizer leg p, including foot and any device on top of the leg	mm	2D, 3D, TD
BEP-01H044.p	Stabilizer beam, lowest edge	Distance between mounting plane and lowest edge of continuous profile of stabilizer beam p. NOTE Continuous profile excludes any local reinforcements or devices.	mm	2D, 3D, TD
BEP-01H045.p	Stabilizer beam height	Height of continuous profile of stabilizer beam p. NOTE Continuous profile excludes any local reinforcements or devices.	mm	2D, 3D, TD

BEP-01W046.p	Stabilizer leg width	Width of stabilizer leg p, excluding foot.	mm	2D, 3D, TD
BEP-01W047.p	Stabilizer foot width	Width of stabilizer foot p. NOTE Stabilizer foot in horizontal position is assumed if tiltable.	mm	2D, 3D, TD



Example of coding of stabilizer beam, leg, and foot

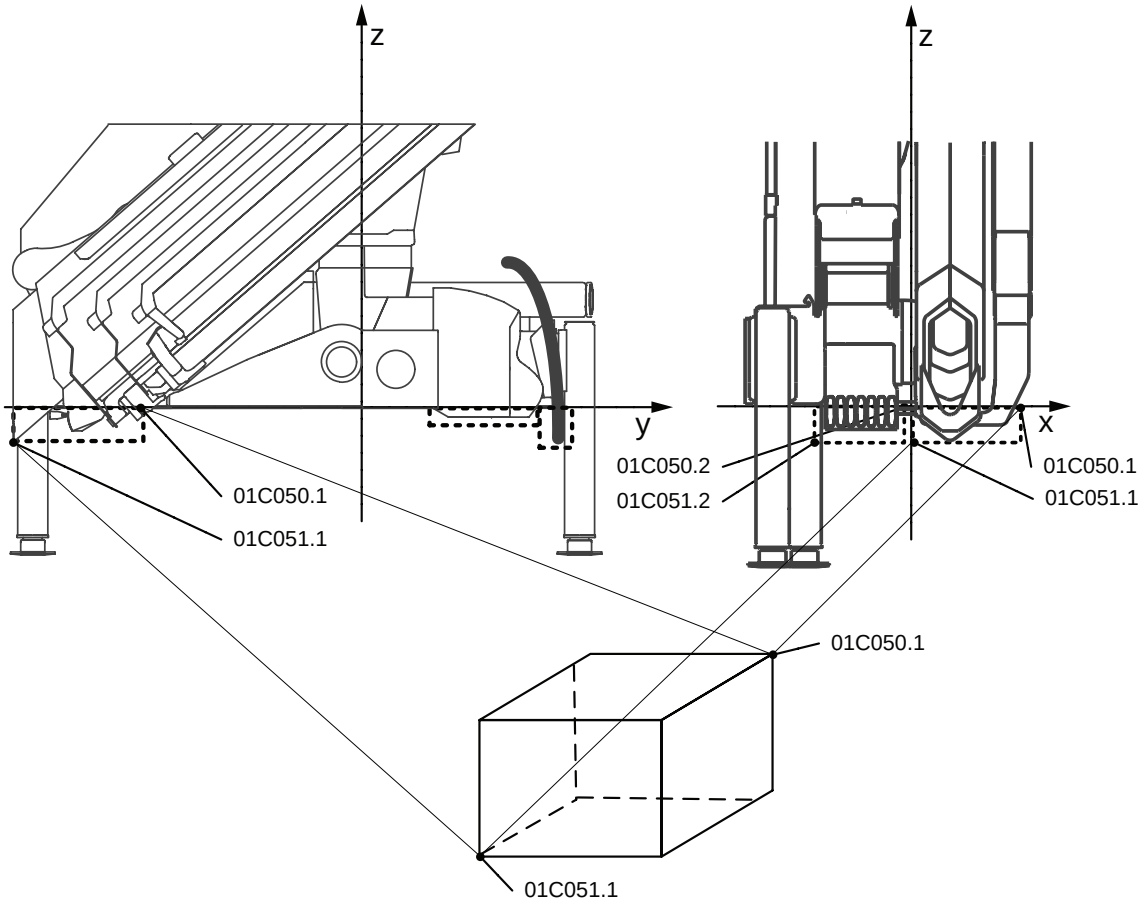
BEP-01L048.p	Stabilizer leg tilting centre	Distance from slewing centre to stabilizer leg p tilting centre.	mm	2D, 3D, TD
BEP-01H048.p	Stabilizer leg tilting centre	Distance from mounting plane to stabilizer leg p tilting centre.	mm	2D, 3D, TD
BEP-01R048.p	Stabilizer leg tilting radius	Radius from stabilizer leg p tilting centre to the intersection of stabilizer leg p centre line and the bottom of the stabilizer foot.	mm	2D, 3D, TD
BEP-01V048.p	Stabilizer leg tilting angle	Tilting angle of stabilizer leg p from operational position to transport position. NOTE With the *x*-axis pointing to the right-hand side (default coordinate system), tilting clockwise gives a positive rotation angle. Tilting counter-clockwise gives a negative rotation angle.	mm	2D, 3D, TD



Example of coding of tiltable stabilizer leg

5.3.3 Space requirements for mounting clearances

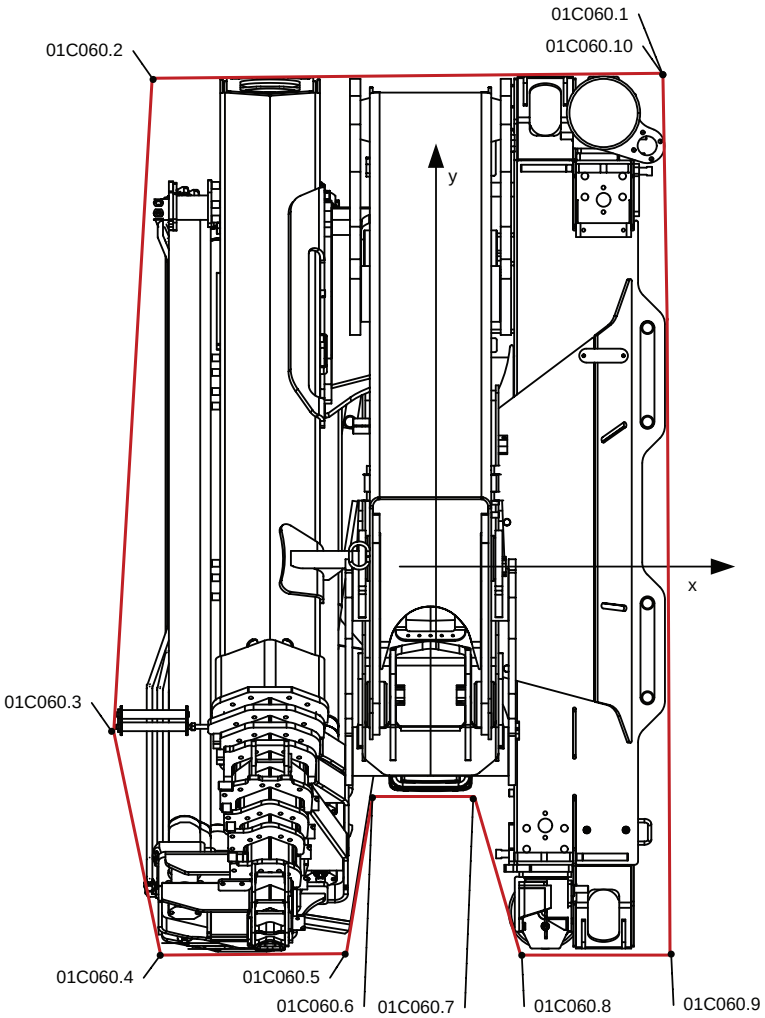
BEP-code	Assignment	Description	Unit	Presented in
BEP-01C050.p	Clearance box p, first corner	Coordinate (x,y,z) of first corner of enclosing box p that must be kept clear for interfering parts of the crane. NOTE 1 The boxes may be given in any order. NOTE 2 Any two corners of a space diagonal may be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p may be omitted if there is only one box.	mm	2D, 3D, TD
BEP-01C051.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 crane. NOTE 1 The boxes may be given in any order. NOTE 2 Any two corners of a space diagonal may be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p may be omitted if there is only one box.	mm	2D, 3D, TD



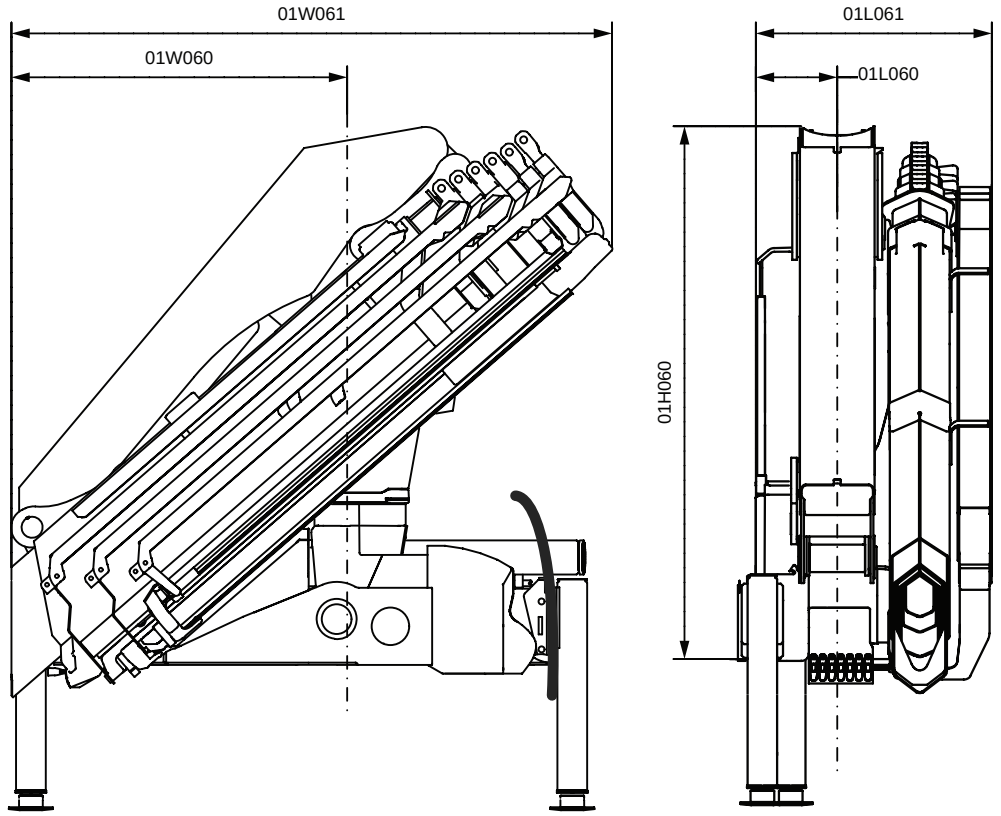
Example of space requirements described with clearance boxes

5.4 Boom system dimensions and space requirements above mounting plane

5.4.1 Dimensions in folded transport position

BEP code	Assignment	Description	Unit	Presented in
BEP-01C060.q	Crane contour, folded, top view	Coordinate (x,y) of crane contour point q, in folded position. NOTE 1 The contour points must be given in the applied order. NOTE 2 The start and end contour points must be the same coordinates. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 Local coordinate system is applied.	mm	2D, 3D, TD
				
Example of coding of crane contour, folded position				
BEP-01L060	Boom system length from slewing centre	Distance from slewing centre to the minimum x coordinate of the boom system.	mm	2D, 3D, TD
BEP-01L061	Boom system length, folded	Overall length of boom system in folded position.	mm	2D, 3D, TD
BEP-01W060	Boom system width from slewing centre	Distance from slewing centre to the minimum y coordinate of the boom system.	mm	2D, 3D, TD

BEP code	Assignment	Description	Unit	Presented in
BEP-01W061	Boom system width, folded	Overall width of boom system in folded position.	mm	2D, 3D, TD
BEP-01H060	Overall height above mounting plane	Overall height above mounting plane in folded position.	mm	2D, 3D, TD



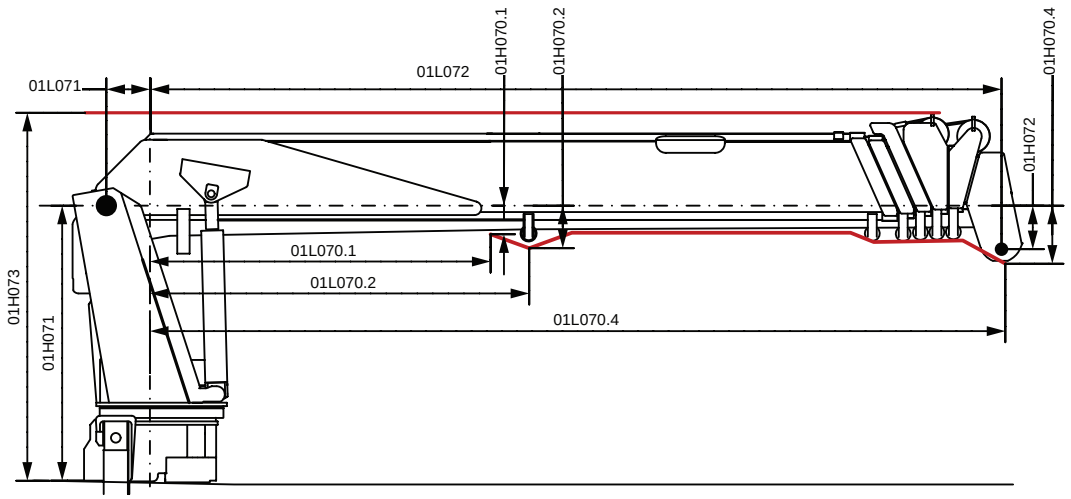
Example of coding of boom main dimensions above mounting plane, folded position

5.4.2 Dimensions in unfolded transport position

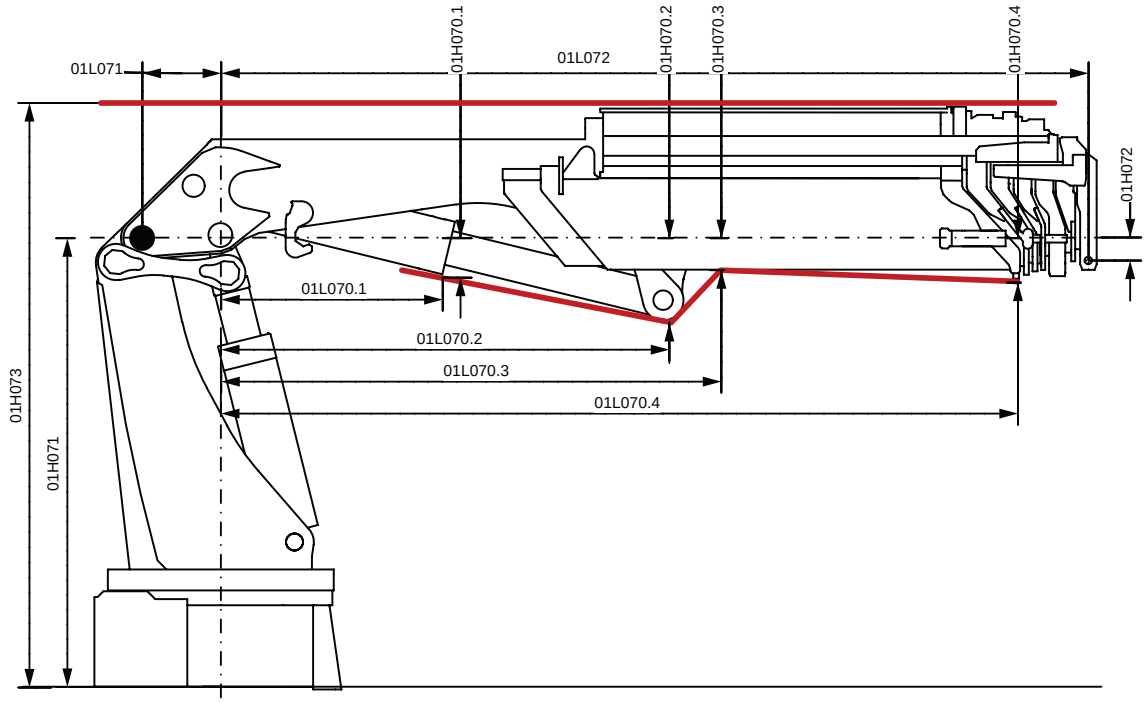
5.4.2.1 Boom horizontal position measurements

BEP-code	Assignment	Description	Unit	Presented in
BEP-01L070.n	Length at measured height	Length at the .n height measured from the slewing centre. NOTE Nominal unfolded transport position is assumed.	mm	2D, 3D, TD
BEP-01H070.n	Profile height of boom system	Profile height at the .n length measured from a centreline which passes through the centre of the first boom rotation axle. NOTE Nominal unfolded transport position is assumed.	mm	2D, 3D, TD
BEP-01L071	Distance from first boom rotation axle to slewing centre	Horizontal distance from first boom rotation axle to slewing centre.	mm	2D, 3D, TD
BEP-01H071	First boom rotation axle position	First boom rotation axle position measured from the mounting plane.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01L072	Outermost load attachment point at the second boom	Distance from slewing centre to the centre of the outermost load attachment point of the second boom.	mm	2D, 3D, TD
BEP-01H072	Outermost load attachment point at the second boom	Height of the centre of the outermost load attachment point of the second boom measured from a centreline which passes through the centre of the first boom rotation axle.	mm	2D, 3D, TD
BEP-01H073	Maximum height of crane, unfolded	Maximum height of crane measured from the mounting plane in the nominal transport position.	mm	2D, 3D, TD



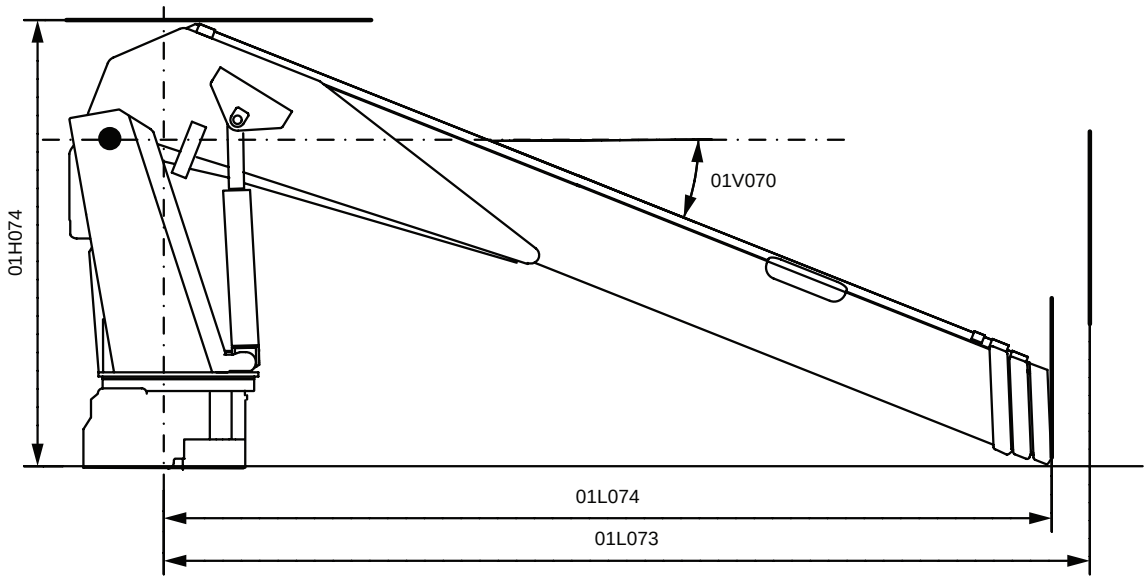
Example showing a loader crane with straight boom system



Example showing a loader crane with articulated boom system

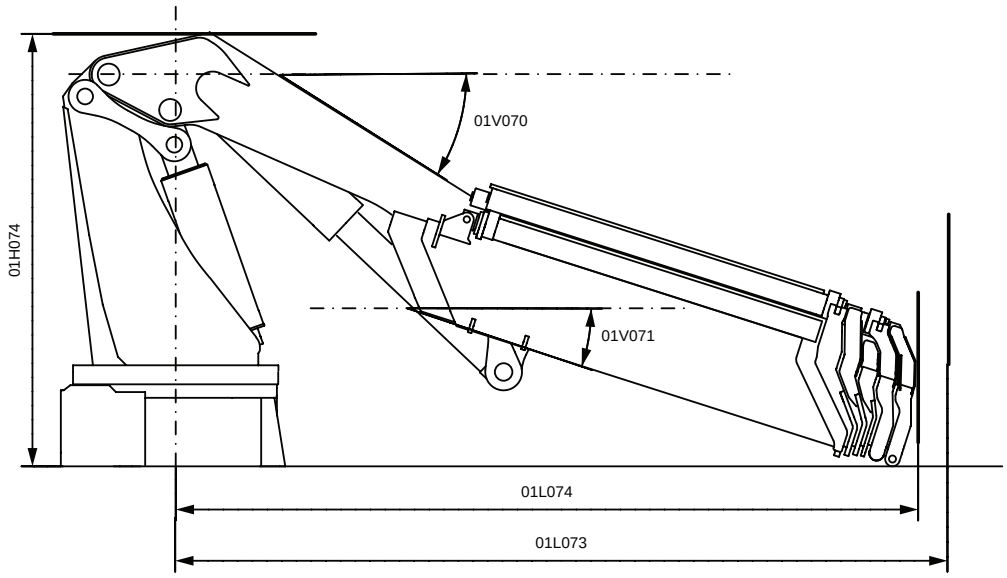
5.4.2.2 Boom transport position measurements

BEP-code	Assignment	Description	Unit	Presented in
BEP-01V070	Minimum space for leaving the loading platform, first boom angle	Angle of the second boom, reached from the nominal unfolded transport position, resulting in the minimum horizontal distance of the boom system required for leaving the loading platform.	mm	2D, 3D, TD
BEP-01V071	Minimum space for leaving the loading platform, second boom angle	Angle of the first boom, reached from the nominal unfolded transport position, resulting in the minimum horizontal distance of the boom system required for leaving the loading platform.	mm	2D, 3D, TD
BEP-01L073	Minimum space required for leaving the loading platform	The minimum horizontal distance of the boom system, reached from the unfolded transport position, required for the boom system for leaving the loading platform.	mm	2D, 3D, TD
BEP-01L074	Minimum space required in unfolded transport position	Minimum space required in unfolded transport position, distance from slewing centre to the outermost point of the second boom.	mm	2D, 3D, TD
BEP-01H074	Minimum height of crane, unfolded	Minimum height of crane when rotated in the axis of the first boom so that the load attachment point is as close as possible to the mounting plane.	mm	2D, 3D, TD



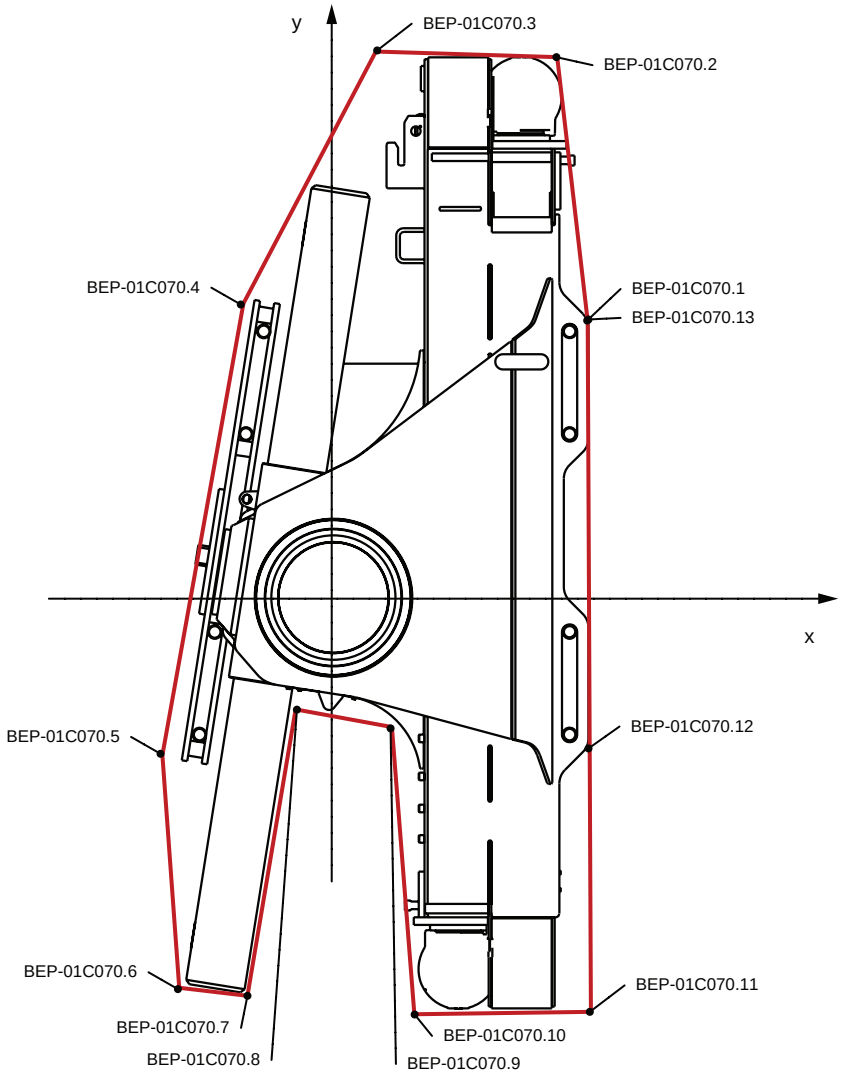
Example showing a loader crane with straight boom system

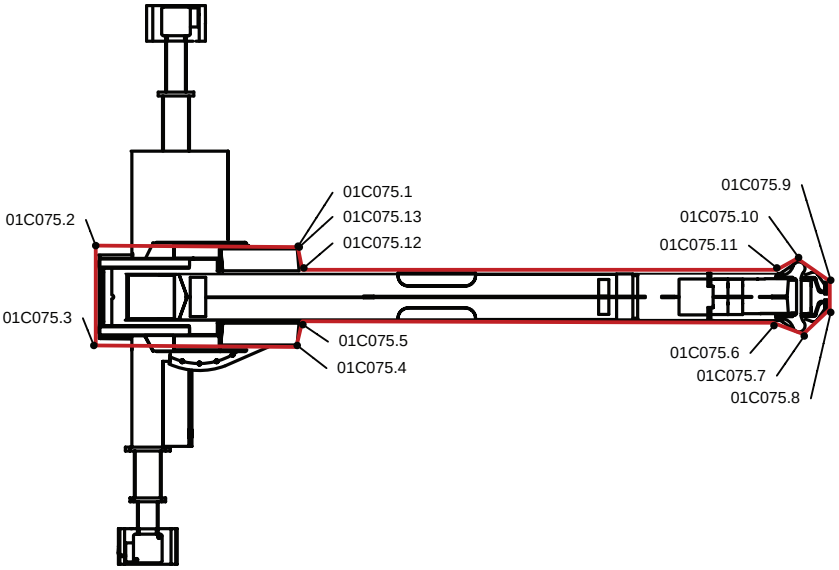
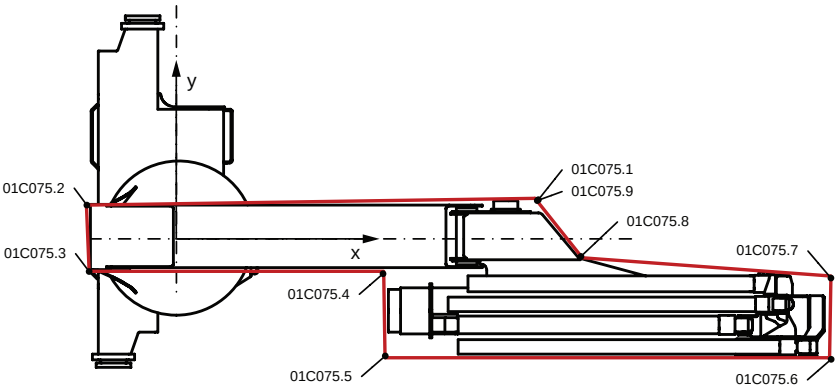
NOTE The height of the loading platform may differ from the mounting plane.

BEP-code	Assignment	Description	Unit	Presented in
				
Example showing a loader crane with articulated boom system				
NOTE The height of the loading platform may differ from the mounting plane				

5.4.2.3 Crane base and boom system contour

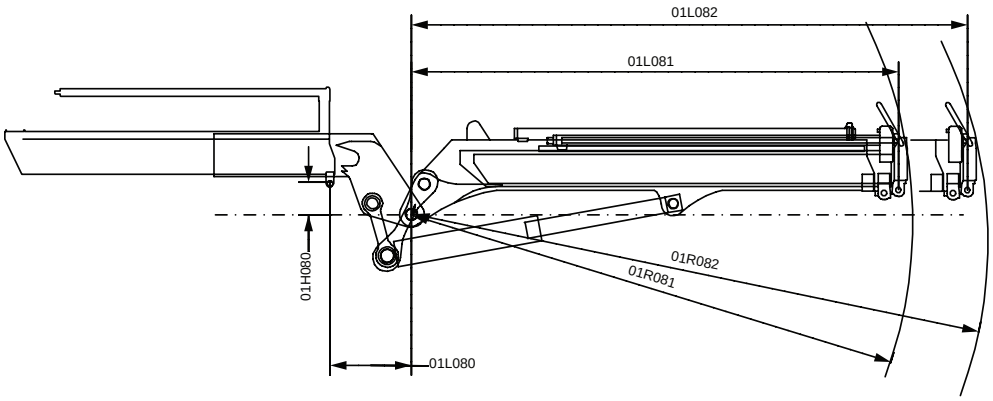
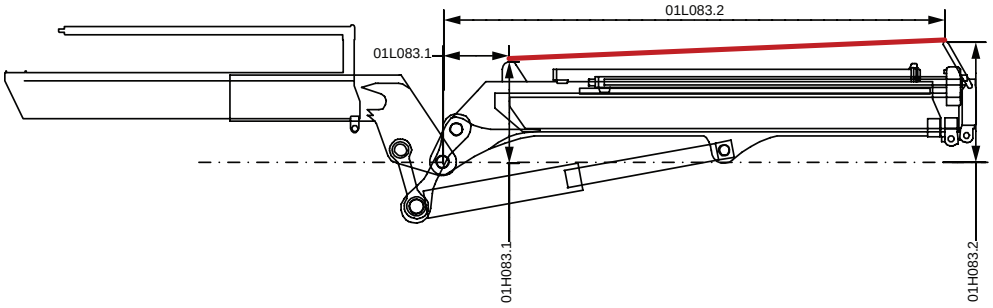
BEP-code	Assignment	Description	Unit	Presented in
BEP-01C070.q	Crane base contour	Coordinate (x,y) of crane base contour point q. NOTE 1 The contour points must be given in the applied order. NOTE 2 The start and end contour points must be the same coordinates. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 Local coordinate system is applied.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of a crane base contour				
BEP-01C075.q	Boom system contour, unfolded, top view	Coordinate (x,y) of unfolded boom system contour point q. NOTE 1 The contour points must be given in the applied order. NOTE 2 The start and end contour points must be the same coordinates. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 Local coordinate system is applied.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
				
Example of contour coding of a loader crane with straight boom system				
				
Example of contour coding of a loader crane with articulated boom system				

5.4.3 Third boom coding

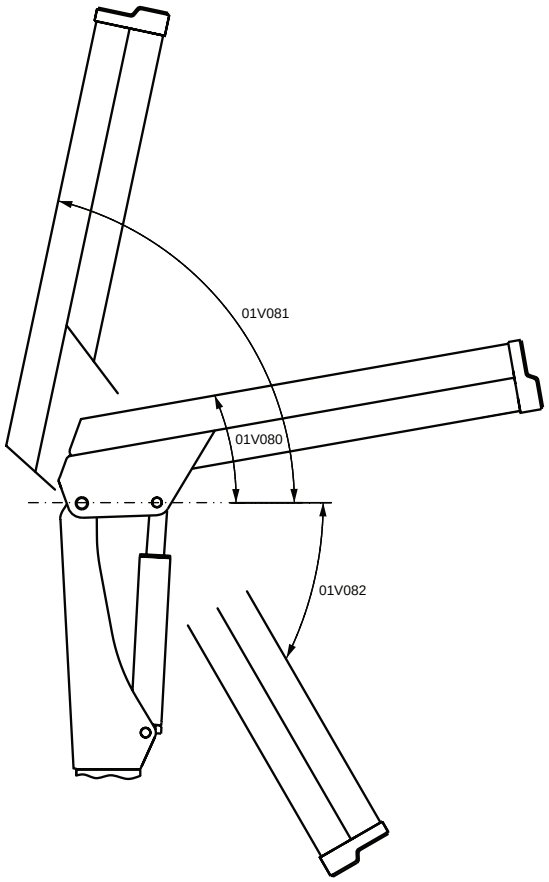
BEP-code	Assignment	Description	Unit	Presented in
NOTE L072 and H072 should be used as references for the load attachment point of the second boom from which the reference line of the third boom is defined.				
BEP-01H080	Vertical distance to third boom rotation point	The vertical distance between the outermost load attachment point on the last boom extension of the second boom and the rotation point of the third boom. NOTE This is usually the last hydraulic boom extension.	mm	2D, 3D, TD
BEP-01L080	Horizontal distance to third boom rotation point	The horizontal distance between the outermost load attachment point on the last hydraulic extension of the second boom and the rotation point of the third boom.	mm	2D, 3D, TD
BEP-01L081	Minimum third boom horizontal reach	The minimum horizontal distance between the rotation point of the third boom and the outermost load attachment point of the last hydraulic extension of the third boom.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01L082	Maximum third boom horizontal reach	The maximum horizontal distance between the rotation point of the third boom and the outermost load attachment point of the last hydraulic extension of the third boom.	mm	2D, 3D, TD
BEP-01R081	Minimum third boom radius	The minimum distance between the rotation point of the third boom and the outermost load attachment point on the last hydraulic extension of the third boom.	mm	2D, 3D, TD
BEP-01R082	Maximum third boom radius	The maximum distance between the rotation point of the third boom and the outermost load attachment point on the last hydraulic extension of the third boom.	mm	2D, 3D, TD
				
Example of coding of a third boom				
BEP-01H083.n	Vertical distance to the n-th point of the upper profile	The vertical distance between the rotation point of the third boom and the n-th point of the upper profile line.	mm	2D, 3D, TD
BEP-01L083.n	Horizontal distance to the n-th point of the upper profile	The horizontal distance between the rotation point of the third boom and the n-th point of the upper profile line.	mm	2D, 3D, TD
				
Example of coding of upper profile of a third boom				

5.4.4 Boom angles

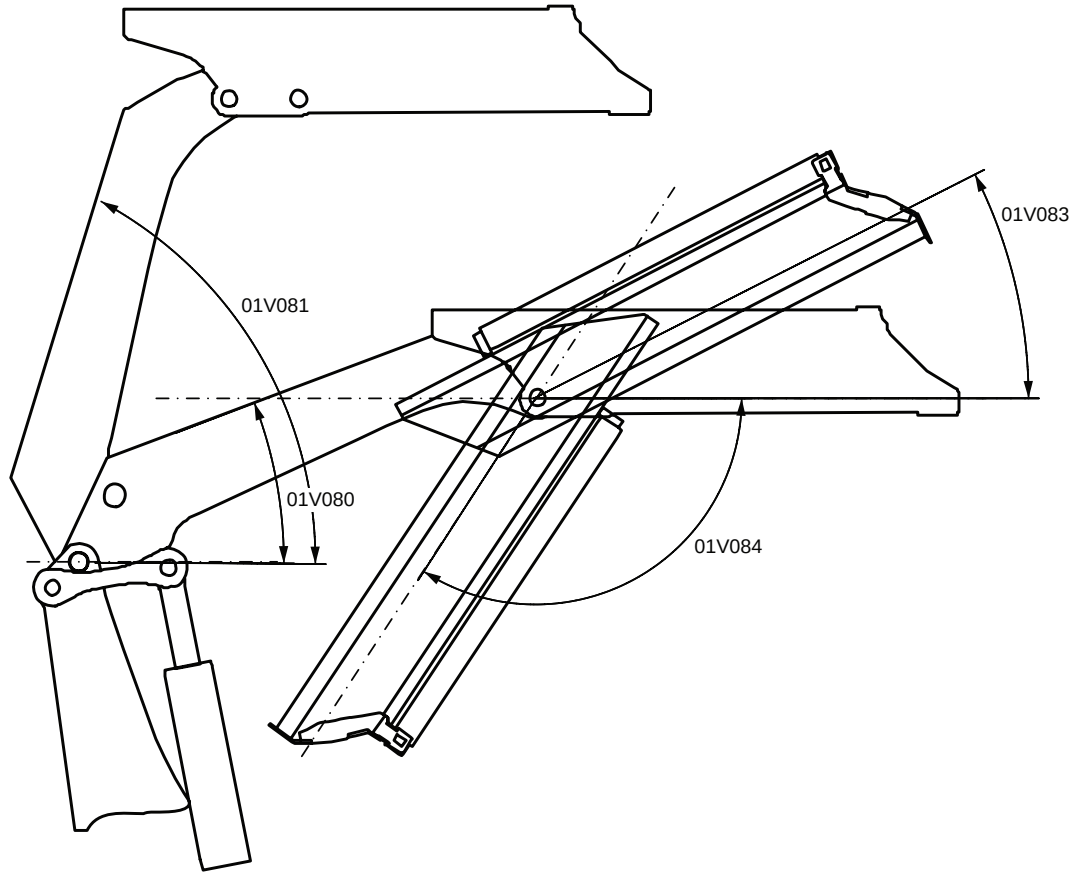
BEP-code	Assignment	Description	Unit	Presented in
BEP-01V080	First boom angle in nominal working position	First boom angle in nominal retracted working position relative to the horizontal plane and measured to the surface on the top of the boom.	°	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01V081	First boom angle in maximum raised position	First boom angle in maximum raised position relative to the horizontal plane and measured to the surface on the top of the boom.	°	2D, 3D, TD
BEP-01V082	First boom angle in maximum lowered position	First boom angle in maximum lowered position relative to the horizontal plane and measured to the surface on the top of the boom.	°	2D, 3D, TD
BEP-01V083	Maximum raised second boom	Angle between maximum raised position of the second boom and the horizontal plane, with the boom system in nominal retracted working position.	°	2D, 3D, TD
BEP-01V084	Maximum lowered second boom	Angle between maximum lowered position of the second boom and the horizontal plane, with the boom system in nominal retracted working position.	°	2D, 3D, TD



Example of coding of boom angles of a loader crane with straight boom system

BEP-code	Assignment	Description	Unit	Presented in



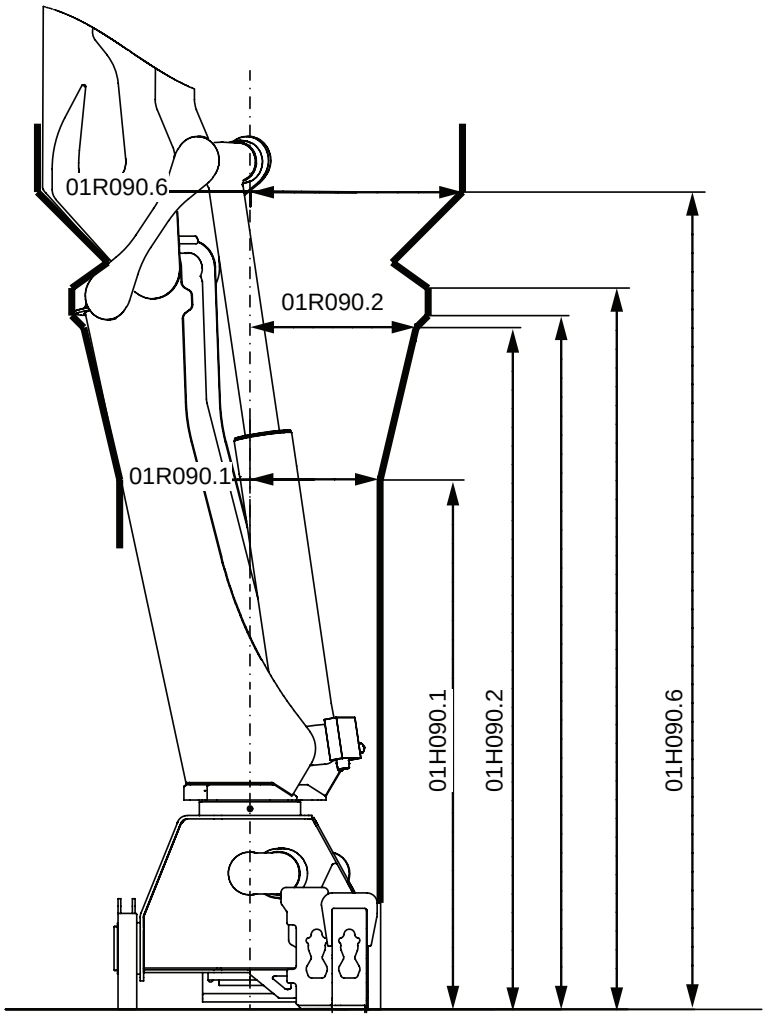
Example of coding of boom angles of a loader crane with articulated boom system

5.5 Crane slewing space requirements

5.5.1 Crane slewing profile radius

BEP-code	Assignment	Description	Unit	Presented in
BEP-01R090.n	Crane slewing radius	Crane slewing radius at height n measured from the mounting plane. Radius shall include all parts (e.g. hoses, top seat, ladder, cabin) that require space during rotation of the column. NOTE 1 If only one radius is given, .n can be omitted and BEP-01H090 can also be omitted. NOTE 2 *n* = 0 is the radius at the zero point.	mm	2D, 3D, TD
BEP-01H090.n	Height at measured radius	Height at the .n radius measured from the mounting plane. NOTE *n* = 0 is the radius at the zero point.	mm	2D, 3D, TD

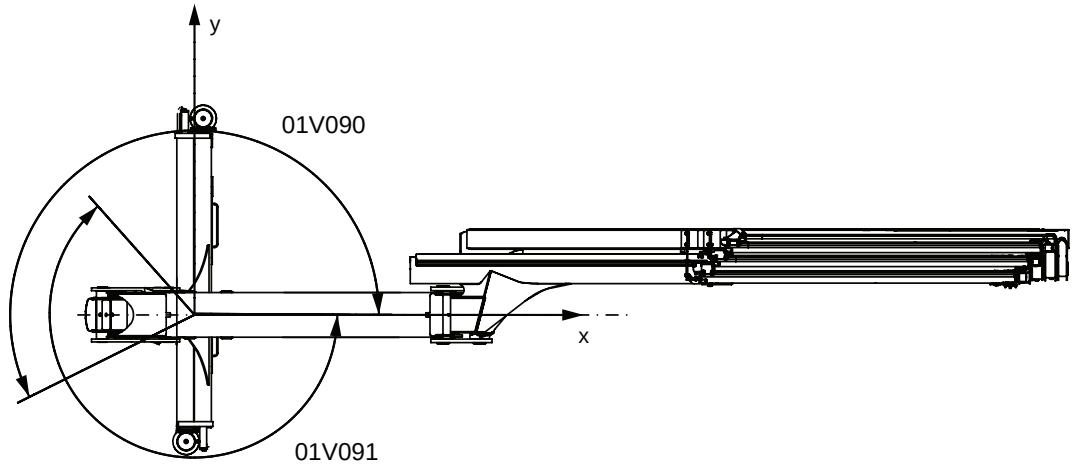
BEP-code	Assignment	Description	Unit	Presented in



Example of coding of crane slewing profile

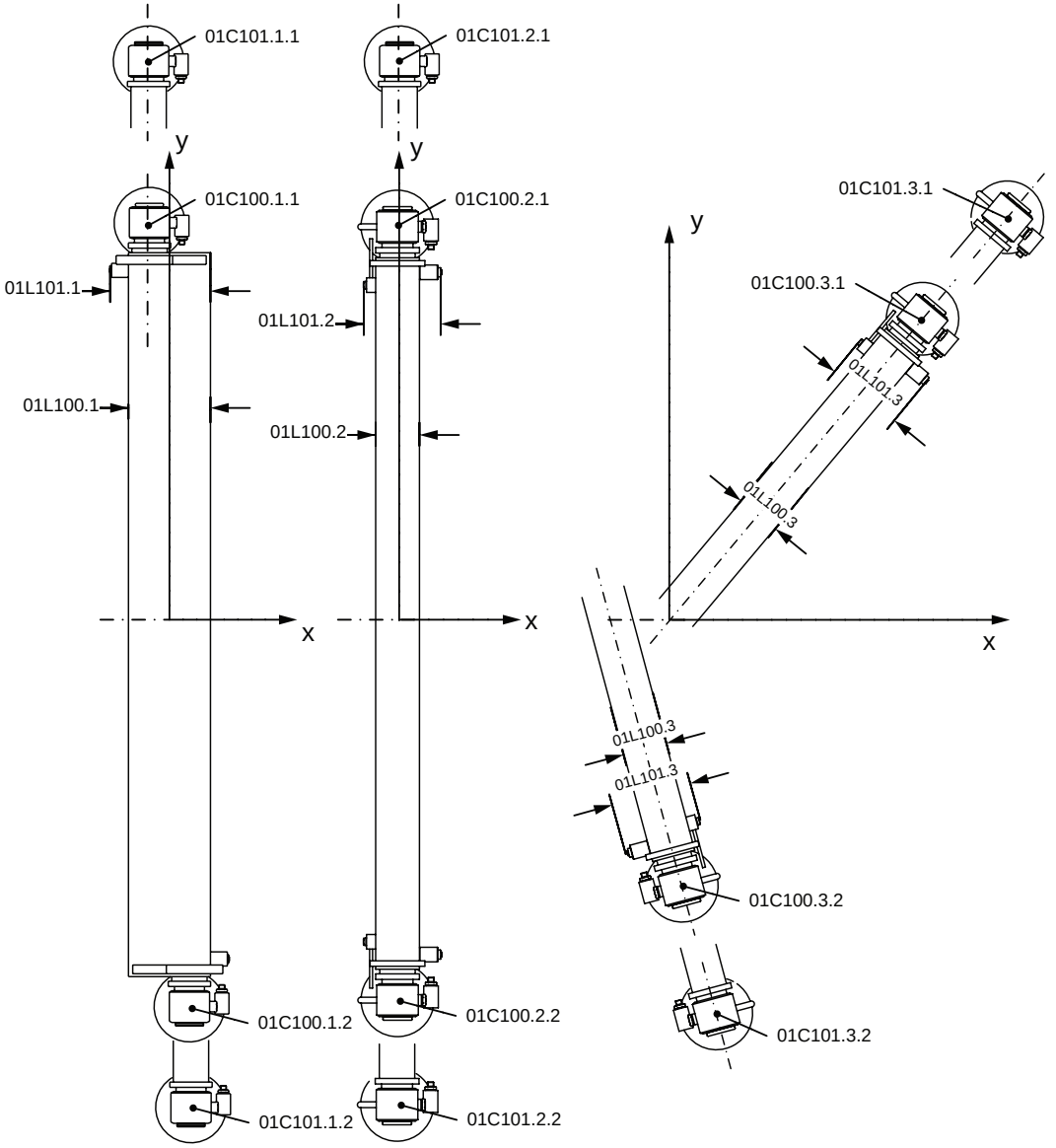
5.5.2 Crane slewing sector/angles

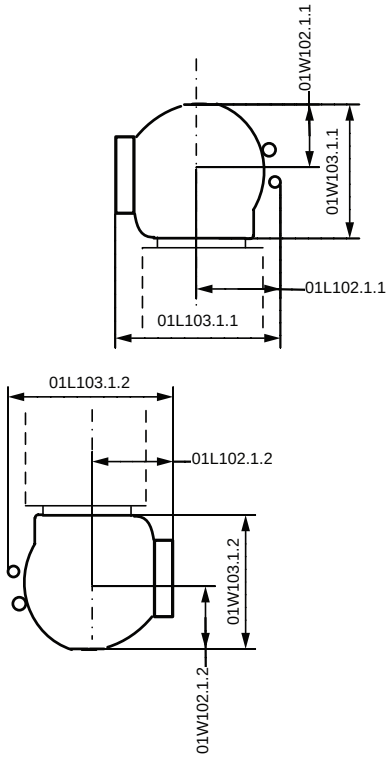
BEP-code	Assignment	Description	Unit	Presented in
BEP-01V090	Maximum counter-clockwise slewing angle	Crane slewing angle measured counter-clockwise from local *x*-axis. NOTE Endless slewing is noted by both BEP-01V090 and BEP-01V091 set to 0.	mm	2D, 3D, TD
BEP-01V091	Maximum clockwise slewing angle	Crane slewing angle measured clockwise from local *x*-axis. NOTE Endless slewing is noted by both BEP-01V090 and BEP-01V091 set to 0.	mm	2D, 3D, TD

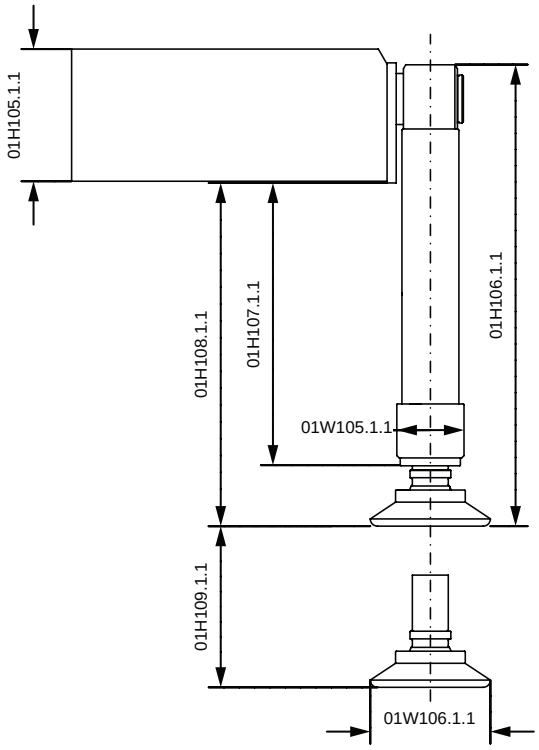
BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of crane slewing angles				

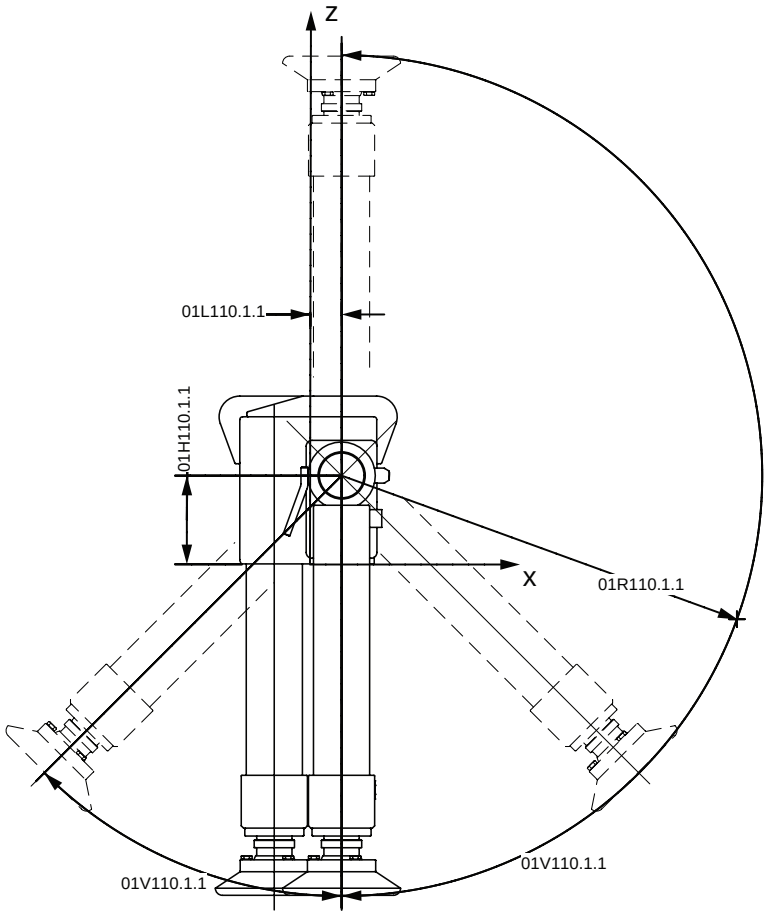
5.6 Auxiliary stabilizer dimensions

BEP-code	Assignment	Description	Unit	Presented in
BEP-01L100.n	Auxiliary stabilizer length, main part	Length of n-th auxiliary stabilizer, main part.	mm	2D, 3D, TD
BEP-01L101.n	Auxiliary stabilizer maximum length	Maximum length of n-th auxiliary stabilizer.	mm	2D, 3D, TD
BEP-01C100.n.p	Auxiliary stabilizer, transport position	Coordinate (x,y) of leg p of n-th auxiliary stabilizer in transport position. NOTE 01C100.1.1 is the coordinate of the first auxiliary stabilizer first leg in transport position.	mm	2D, 3D, TD
BEP-01C101.n.p	Auxiliary stabilizer, extended position	Coordinate (x,y) of leg p of n-th auxiliary stabilizer in maximum extended position.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of auxiliary stabilizer dimensions				
BEP-01L102.n.p	Distance auxiliary stabilizer leg centre to edge	Distance from centre axis of leg p of n-th auxiliary stabilizer to outermost edge of stabilizer leg p in the positive x direction, excluding stabilizer foot.	mm	2D, 3D, TD
BEP-01L103.n.p	Auxiliary stabilizer leg overall horizontal length	Overall horizontal length of leg p of n-th auxiliary stabilizer, excluding stabilizer, foot but including sensors, hydraulic valves, and other components.	mm	2D, 3D, TD
BEP-01W102.n.p	Distance auxiliary stabilizer leg centre to edge	Distance from centre axis of leg p of n-th auxiliary stabilizer to outermost edge of stabilizer leg p, excluding stabilizer foot.	mm	2D, 3D, TD
BEP-01W103.n.p	Auxiliary stabilizer leg overall width	Overall width of the leg p of n-th auxiliary stabilizer, excluding stabilizer foot but including sensors, hydraulic valves, and other components.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of auxiliary stabilizer leg dimensions (top view)				
BEP-01H105.n.p	Auxiliary stabilizer beam height	Height of continuous profile of n-th auxiliary stabilizer beam p. NOTE Continuous profile excludes any local reinforcements or devices.	mm	2D, 3D, TD
BEP-01H106.n.p	Auxiliary stabilizer leg height	Minimum height of n-th auxiliary stabilizer leg p, including foot and any device on top of leg p.	mm	2D, 3D, TD
BEP-01H107.n.p	Auxiliary stabilizer leg distance to mounting plane	Distance between mounting plane and lowest edge of non-extendable part of n-th auxiliary stabilizer leg p.	mm	2D, 3D, TD
BEP-01H108.n.p	Auxiliary stabilizer leg distance to mounting plane, including foot	Distance between mounting plane and lowest edge of non-extendable part of n-th auxiliary stabilizer leg p, including foot.	mm	2D, 3D, TD
BEP-01H109.n.p	Auxiliary stabilizer leg stroke	Maximum stroke of extendable part of n-th auxiliary stabilizer leg p.	mm	2D, 3D, TD
BEP-01W105.n.p	Auxiliary stabilizer leg width	Width of n-th auxiliary stabilizer leg p, excluding foot. NOTE Maximum width should be measured.	mm	2D, 3D, TD
BEP-01W106.n.p	Auxiliary stabilizer foot width	Width of n-th auxiliary stabilizer foot p. NOTE Stabilizer foot in horizontal position is assumed, if tiltable.	mm	2D, 3D, TD

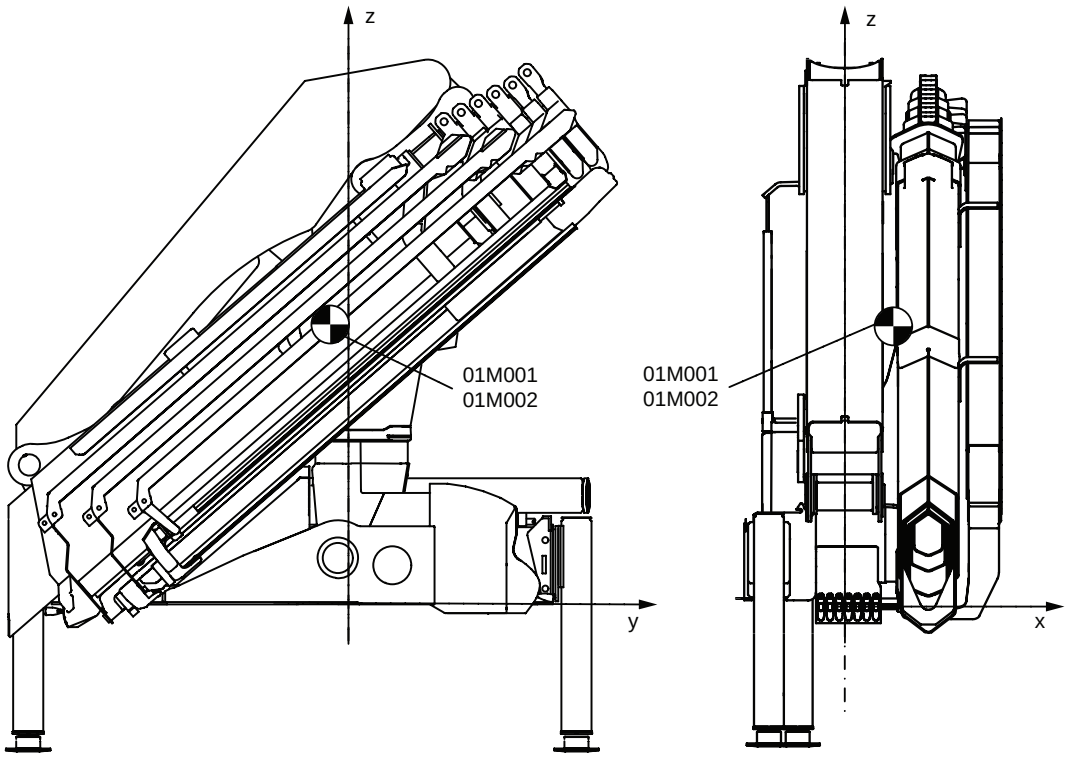
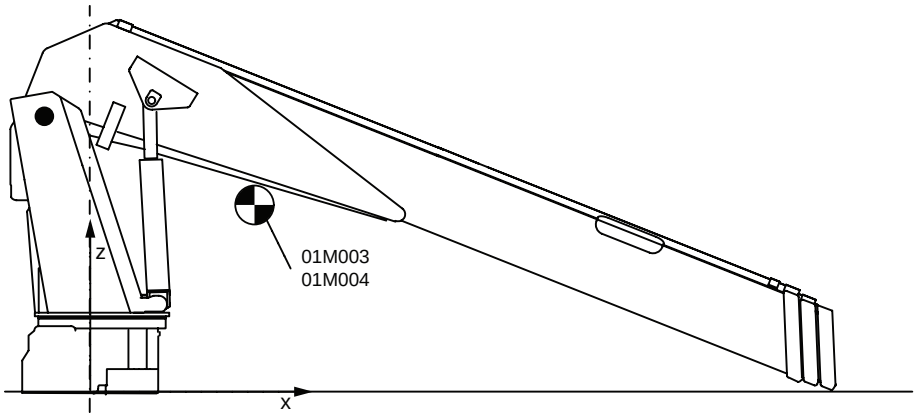
BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of auxiliary stabilizer leg dimensions (side view)				
BEP-01L110.n.p	Auxiliary stabilizer leg tilting centre	Distance from the zero point to the n-th auxiliary stabilizer leg p tilting centre.	mm	2D, 3D, TD
BEP-01H110.n.p	Auxiliary stabilizer leg tilting centre	Distance from the zero point to the n-th auxiliary stabilizer leg p tilting centre.	mm	2D, 3D, TD
BEP-01R110.n.p	Auxiliary stabilizer leg tilting radius	Distance from the n-th auxiliary stabilizer leg p tilting centre to the bottom of the stabilizer foot.	mm	2D, 3D, TD
BEP-01V110.n.p	Auxiliary stabilizer leg tilting angle	Tilting angle of n-th auxiliary stabilizer leg p from operational position to transport position.	mm	2D, 3D, TD

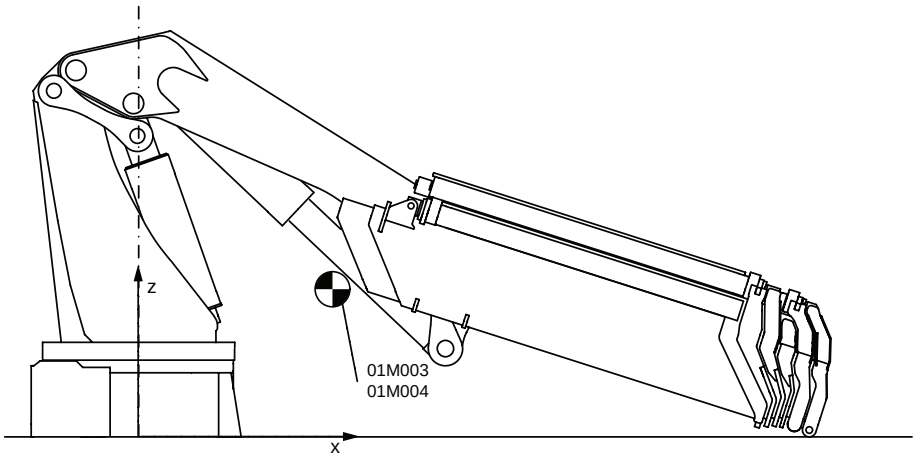
BEP-code	Assignment	Description	Unit	Presented in
				
Example of coding of tiltable auxiliary stabilizer leg				

6 Coding of masses

6.1 Mass points in transport position

BEP-code	Assignment	Description	Unit	Loading	Presented in
NOTE 1 All mass points are given in the local coordinate systems. NOTE 2 Mass points are chosen to communicate centre of gravity measurements in an efficient way.					
BEP-01M001	Mass point, folded transport position, excluding third boom system	Mass point of complete crane with main stabilizers (if available) in its specific configuration, with the boom system folded (including fluids), without any third boom system. EXAMPLE Crane with top seat, hoist, and manual extensions.	kg, mm	-	2D, 3D, TD
BEP-01M002	Mass point, folded transport position, including third boom system	Mass point of complete crane with main stabilizers (if available) in its specific configuration, with the boom system folded (including fluids), with third boom system. EXAMPLE Crane with top seat, hoist, third boom system, and manual extensions.	kg, mm	-	2D, 3D, TD

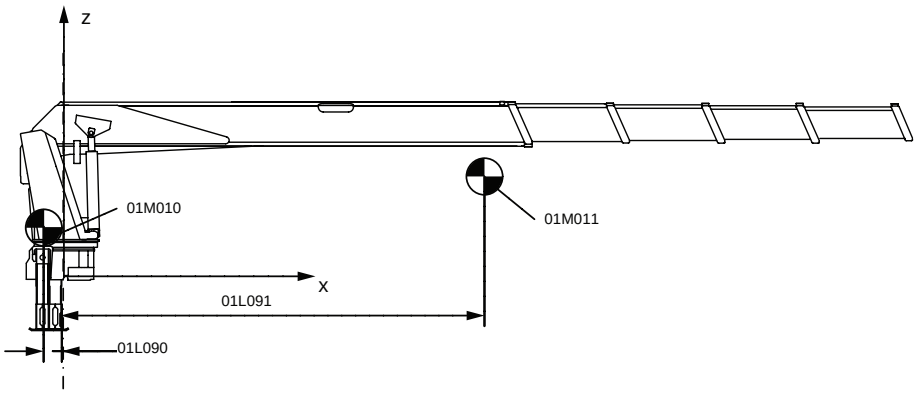
BEP-code	Assignment	Description	Unit	Loading	Presented in
					
Example of coding of mass point, folded transport position					
BEP-01M003	Mass point, unfolded transport position, excluding third boom system	Mass point of complete crane with main stabilizers (if available) in its specific configuration, with the boom system in a specific transport position (including fluids), without any third boom system. NOTE Boom position in accordance with 5.4.2.2.	kg, mm	-	2D, 3D, TD
BEP-01M004	Mass point, unfolded transport position, including third boom system	Mass point of complete crane with main stabilizers (if available) in its specific configuration, with the boom system in a specific transport position (including fluids), with third boom system. NOTE Boom position in accordance with 5.4.2.2.	kg, mm	-	2D, 3D, TD
					
Example of coding of mass point, unfolded transport position, loader crane with straight boom system					

BEP-code	Assignment	Description	Unit	Load-ing	Presented in
					
Example of coding of mass point, unfolded transport position, loader crane with articulated boom system					
BEP-01M005	Mass point of mounting kit	Mass point of mounting kit for the base.	kg, mm	-	2D, 3D, TD
BEP-01M006.n	Mass point of auxiliary stabilizer kits in transport position	Mass point of auxiliary stabilizer kits in transport position, including fluids.	kg, mm	-	2D, 3D, TD

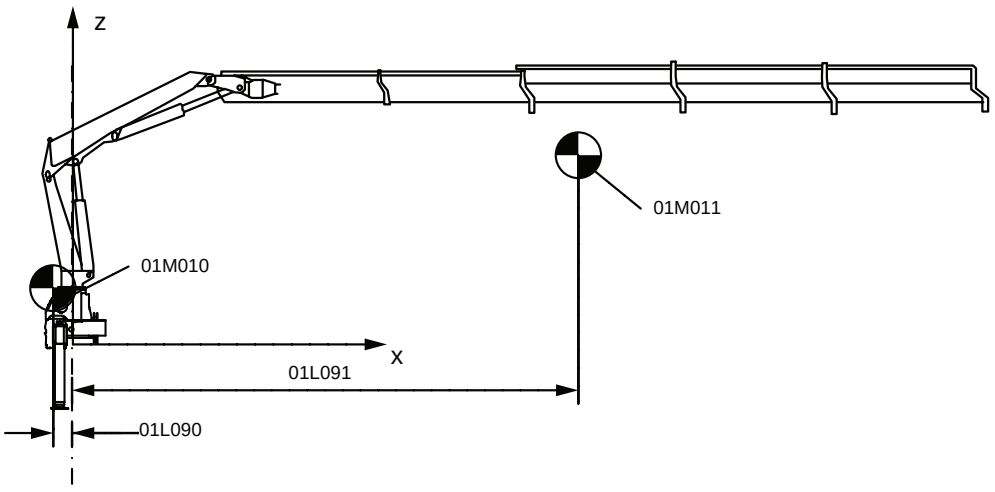
6.2 Masses with distances in working mode for stability calculations

BEP-code	Assignment	Description	Unit	Load-ing	Presented in
BEP-01L090	Centre of gravity of base	Distance from slewing centre to centre of gravity of base. NOTE This includes components mounted to the base.	mm	-	2D, 3D, TD
BEP-01M010	Mass of base	Mass of base, including stabilizers and fluids. NOTE This includes components mounted to the base.	kg	-	2D, 3D, TD
BEP-01L091	Centre of gravity of boom system, including second boom	Centre of gravity of rotating parts in nominal extended working position, including column and first and second boom. NOTE This includes components, mounted to the slewing part of the crane.	mm	-	2D, 3D, TD
BEP-01M011	Mass of column and boom system	Mass of rotating parts including column, boom system, and including fluids. NOTE This includes components mounted to the slewing part of the crane such as hoist, top seat, and cabin.	kg	-	2D, 3D, TD
BEP-01L092	Centre of gravity of boom system, including third boom	Centre of gravity of rotating parts in nominal extended working position, including column and first, second, and third boom. NOTE This includes components mounted to the slewing part of the crane.	mm	-	2D, 3D, TD

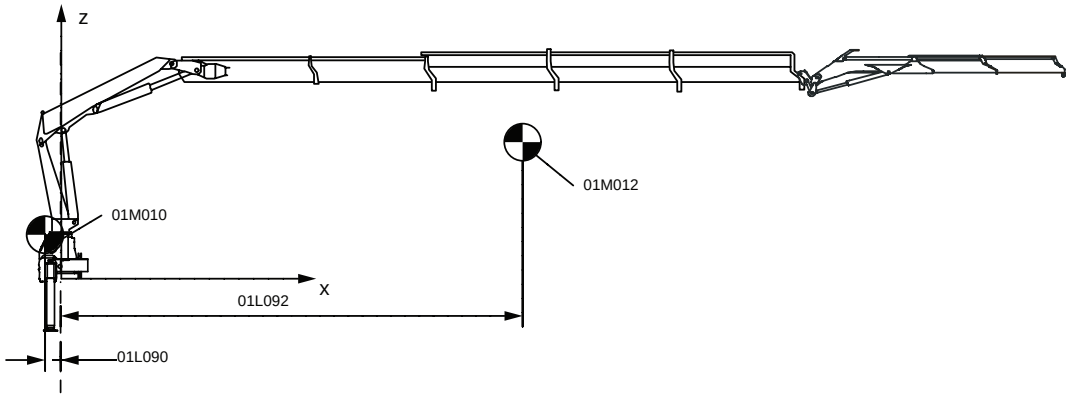
BEP-code	Assignment	Description	Unit	Loading	Presented in
BEP-01M012	Mass of boom system, including third boom	Mass of rotating parts, including column, first, second and third boom, and including fluids. NOTE This includes components mounted to the slewing part of the crane.	kg	-	2D, 3D, TD
BEP-01L093	Maximum outreach of gross load, without third boom	Maximum horizontal outreach of gross load, without third boom. NOTE Maximum performance to be specified by the crane manufacturer.	mm	-	2D, 3D, TD
BEP-01M013	Gross load at maximum outreach, without third boom	Gross load at maximum horizontal outreach without third boom. NOTE Maximum performance to be specified by the crane manufacturer.	kg	-	2D, 3D, TD
BEP-01L094	Maximum outreach of gross load, including third boom	Maximum horizontal outreach of gross load, including third boom. NOTE Maximum performance to be specified by the crane manufacturer.	mm	-	2D, 3D, TD
BEP-01M014	Gross load at maximum outreach, including third boom	Gross load at maximum horizontal outreach including third boom. NOTE Maximum performance to be specified by the crane manufacturer.	kg	-	2D, 3D, TD



Example of coding of CG of base and boom system, loader crane with straight boom system in working mode



Example of coding of CG of base and boom system, loader crane with articulated boom system in working mode

BEP-code	Assignment	Description	Unit	Load-ing	Presented in
					
Example of coding of CG of base and boom system, loader crane with articulated boom system and third boom in working mode					

7 Coding of forces and moments

BEP-code	Assignment	Description	Unit	Presented in
BEP-01T001	Maximum total lifting moment	Sum of net lifting moment and the moment produced by dead loads.	kN·m	2D, 3D, TD
BEP-01T002	Maximum total dynamic lifting moment	Sum of net lifting moment multiplied by its dynamic coefficient and the moment produced by dead loads multiplied by their dynamic coefficients.	kN·m	2D, 3D, TD
BEP-01F001	Maximum vertical force	Sum of the maximum working load by the dead loads.	kN	2D, 3D, TD
BEP-01F002	Maximum dynamic vertical force	Sum of the maximum working load multiplied by its dynamic coefficient and the dead loads multiplied by their dynamic coefficients.	kN	2D, 3D, TD

8 Coding of general crane data

8.1 General crane data

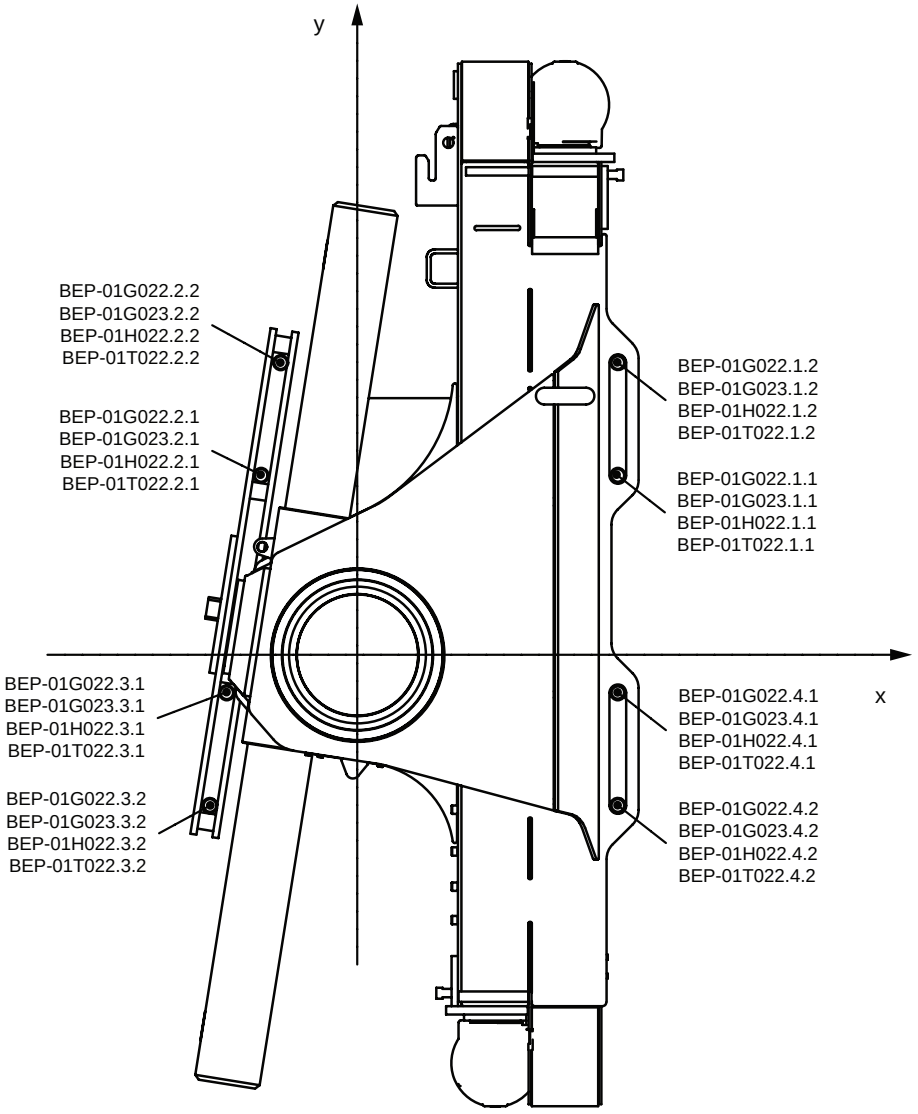
BEP-code	Assignment	Description	Presented in
BEP-01G000	Crane manufacturer administrative code set	Crane manufacturer party designation (.p) in accordance with administrative codes given in ISO 21308-3.	TD
BEP-01G001	Crane type	Type of crane. EXAMPLE Timber crane, knuckle boom crane, long boom crane.	TD
BEP-01G002	Crane model name	Official model name from manufacturer, including fixed mounted equipment.	TD
BEP-01G003	ID and year of production	ID number of crane and year of production.	TD
BEP-01G004	Control type	Type of crane handling. EXAMPLE Remote control, lever.	TD

BEP-code	Assignment	Description	Presented in
BEP-01G005	Control station type	Type of control station. EXAMPLE High seat, top stand.	TD
BEP-01G006	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-01G007	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-01G008.n	Auxiliary stabilizer model name	Official model name from manufacturer of auxiliary stabilizer.	TD
BEP-01G009.n	Auxiliary stabilizer manufacturer administrative code set	Auxiliary stabilizer manufacturer party designation (.p) in accordance with administrative codes given in ISO 21308-3.	TD

8.2 Mechanical interfaces

BEP-code	Assignment	Description	Unit	Presented in
BEP-01G020	Type of fixation	Type of fixation on the truck. EXAMPLE Bolts, tie rods, quick fixation.	-	TD
BEP-01G021.p	Number of frame bolts	Number of frame bolts applied in slot p as defined in BEP-01C005 and BEP-01C006. NOTE .p may be omitted if all bolts are identical, in which case, the overall number of bolts is specified.	-	TD
BEP-01G022.p.b	Dimension of frame bolts	Dimension of frame bolts applied in slot p as defined in BEP-01C005 and BEP-01C006. NOTE 1 .b identifies the specific bolt. NOTE 2 .b may be omitted if all dimensions for slot .p are the same. NOTE 3 .p may be omitted if the dimensions of all bolts are identical. EXAMPLE M24, UNC 1”.	-	TD
BEP-01G023.p.b	Grade of frame bolts	Grade of frame bolts applied in slot p as defined in BEP-01C005 and BEP-01C006. NOTE 1 .b identifies the specific bolt. NOTE 2 .b may be omitted if all grades for slot .p are the same. NOTE 3 .p may be omitted if the grades of all bolts are identical. EXAMPLE 10.9.	-	TD
BEP-01H022.p.b	Minimum bolt length	Required minimum tensile length of frame bolts applied in slot p as defined in BEP-01C005 and BEP-01C006. NOTE 1 .b may be omitted if all tensile lengths for slot .p are the same. NOTE 2 .p may be omitted if the tensile lengths of all bolts are identical.	mm	TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01T022.p.b	Tightening torque	Required tightening torque of frame bolts applied in slot p as defined in BEP-01C005 and BEP-01C006. NOTE 1 .b may be omitted if all tightening torques for slot .p are the same. NOTE 2 .p may be omitted if the tightening torques of all bolts are identical.	N·m	TD



Example of coding of frame bolt characteristics

8.3 Hydraulics equipment and interfaces

BEP-code	Assignment	Description	Unit	Presented in
BEP-01G040	Recommended oil flow	Optimal oil flow for working speed of crane.	litres/min[a]	TD
BEP-01G041	Working pressure	Maximum working pressure of crane.	MPa	TD
BEP-01G042	Oil tank volume	Required minimum volume of external oil tank.	litres[b]	TD
BEP-01G043	Type of oil	Recommended oil type from crane manufacturer.		TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-01G044	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.			

8.4 Electrical/electronic equipment and interfaces

BEP-code	Assignment	Description	Presented in
BEP-01G060	Power supply	Required power supply to operate the crane. EXAMPLE Power (kW), number of signal I/O lines, grounding.	TD
BEP-01G061	Type of electronic interface	Description and serial number of electronic interface.	TD
BEP-01G062	CAN bus option	CAN bus signals and protocol type.	TD

8.5 Load lifting attachments

BEP-code	Assignment	Description	Presented in
BEP-01G080	Type of equipment	Description and data of demountable equipment. EXAMPLE Serial number, internal name, application.	TD
BEP-01G081	Maximum dimension	Information of the maximum dimension, L × W × H.	TD
BEP-01G082	Type of fixation to crane	Type of fixation/interface to the crane and location. EXAMPLE Bolted on load attachment point.	TD
BEP-01G083	Support from crane side	Kind of support needed to operate removable equipment. EXAMPLE I/O lines, hose lines.	TD
BEP-01G084	Transport position	Kind of transport position with mounted equipment. EXAMPLE Crane unfolded, crane folded.	TD

Annex A
(normative)

XML coding related to this part of ISO 21308

A.1 XML version of this part of ISO 21308

To facilitate the communication of BEP codes and values between the parties involved, an XML version has been drafted, according to the rules and structure of ISO/PAS 21308-1[1)].

Showing the complete code in Annex A would require many pages of plain XML code. Thus, 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 website, at the following URL: http://standards.iso.org/iso/21308.

A.2 ISO 21308 Part 5 XML code (excerpt of ISO 21308-5.xsd)

```
<?xml version="1.0" encoding="utf-8"?>
<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 21308-5</xs:appinfo>
    <xs:documentation xml:lang="en-us">ISO 21308 data exchange</xs:documentation>
  </xs:annotation>
  <!-- Add ISO 21308 part 5 contents to the administrativeType type -->
  <xs:redefine schemaLocation="http://standards.iso.org/iso/21308/ISO21308-2.xsd">
    <xs:complexType name="bepType">
      <xs:complexContent>
        <xs:extension base="bepType">
          <xs:sequence>
            <xs:element name="LoaderCrane" type="loaderCraneType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="AuxiliaryStabilizers" type ="loaderCraneAuxiliaryStabilizer-
sType" minOccurs="0" maxOccurs="1"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:redefine>

  <!-- Define the loadercrane type -->
  <xs:complexType name="loaderCraneType">
    <xs:sequence>
      <xs:element name="Geometry" type="loaderCraneGeometryType" minOccurs="0" maxOc-
curs="1"/>
      <xs:element name="Mass" type="loaderCraneMassType" minOccurs="0" maxOccurs="1"/>
      <xs:element name="ForceAndMoments" type="loaderCraneForceAndMomentsType" minOc-
curs="0" maxOccurs="1"/>
      <xs:element name="General" type="loaderCraneGeneralType" minOccurs="0" maxOc-
curs="1"/>
      <xs:element name="Pictures" type="picturesType" minOccurs="0" maxOccurs="1">
        <xs:annotation>
          <xs:documentation>Loader Crane Drawing Files</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
```

1) Under revision in order to include XML coding.

```
</xs:complexType>

  <!-- Define the loadercrane geometry type -->
… …
```

Bibliography

[1] ISO 4130, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions*

[2] ISO 15442, *Cranes — Safety requirements for loader cranes*

ICS 43.080.01

Price based on 51 pages