



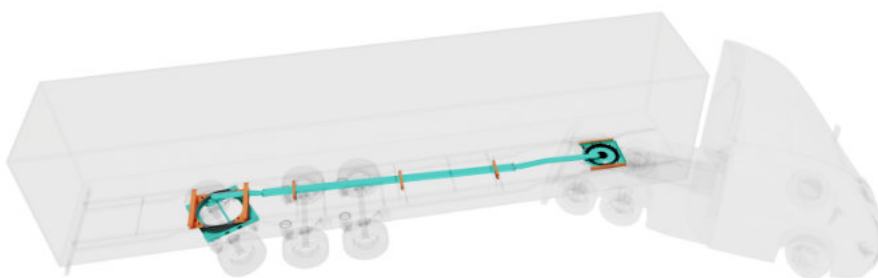
Econogy

driving tomorrow



ySteer

yS1
Assembly
manual



This manual is written for vehicle manufacturers that install the Econogy ySteer mechanical steering system for semi-trailers. It contains essential information about equipping vehicles with ySteer.

Any modifications to the steering system will void the warranty and vehicle homologation.

Incorrect installation of the steering system will void the warranty.

Before putting the steering system into operation, ensure that the semi-trailer, on which the system is being installed, complies with any applicable road traffic regulations.

The system should only be put into operation in accordance with other manuals that apply to the truck-trailer combination.

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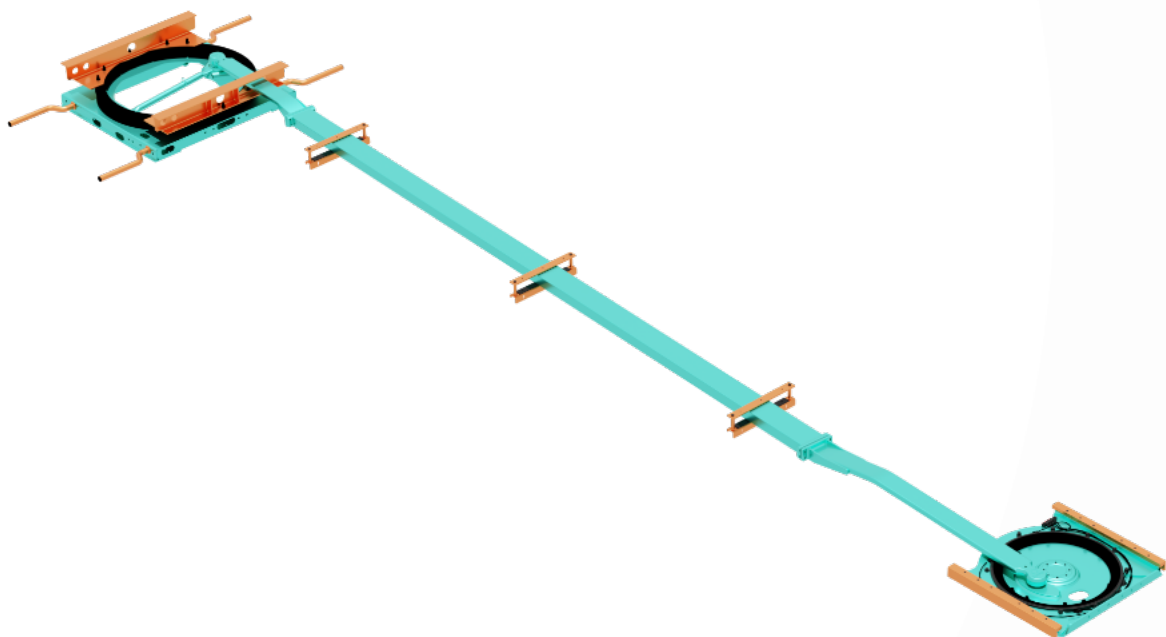
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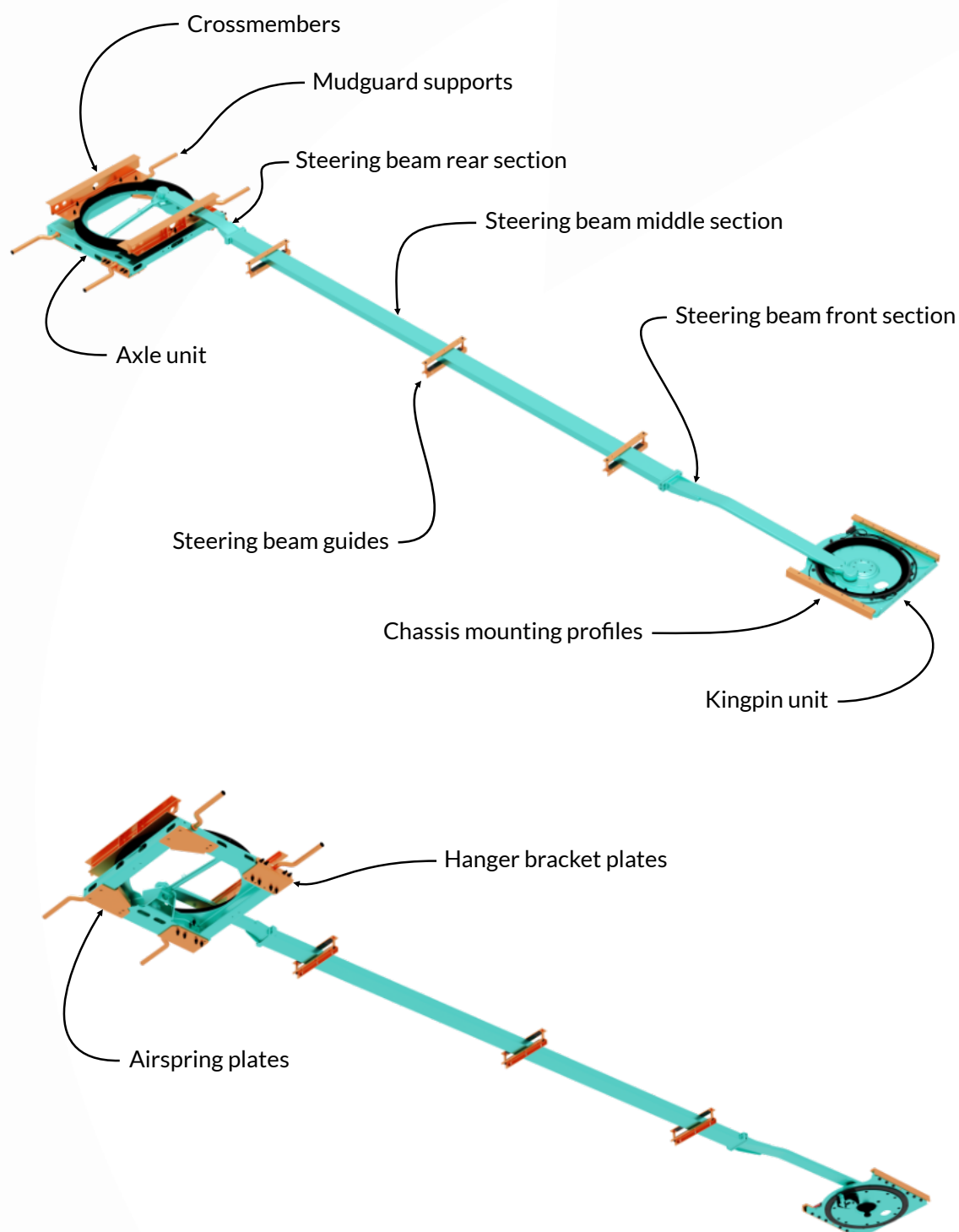
1. Description	4
1.1 yS1 Steering system	4
1.2 ySteer Modules	5
1.3 Type shield locations	6
2. Preparation of the Axleunit	7
2.1 Hanger bracket bracing	7
2.2 (Pre-)drilled holes for the airbags	8
3. Installation	9
3.1 Installing the Kingpinunit (Weld-on type)	9
3.2 Installing the Axleunit	17
3.3 Installing the steering beam	22
4. Entering service	26
5. Appendix	29
5.1 Type code system	29
4.1 yS1 System Overview	30
5.2 Inspection data	31
6. Notes	32

1. Description

1.1 yS1 Steering system

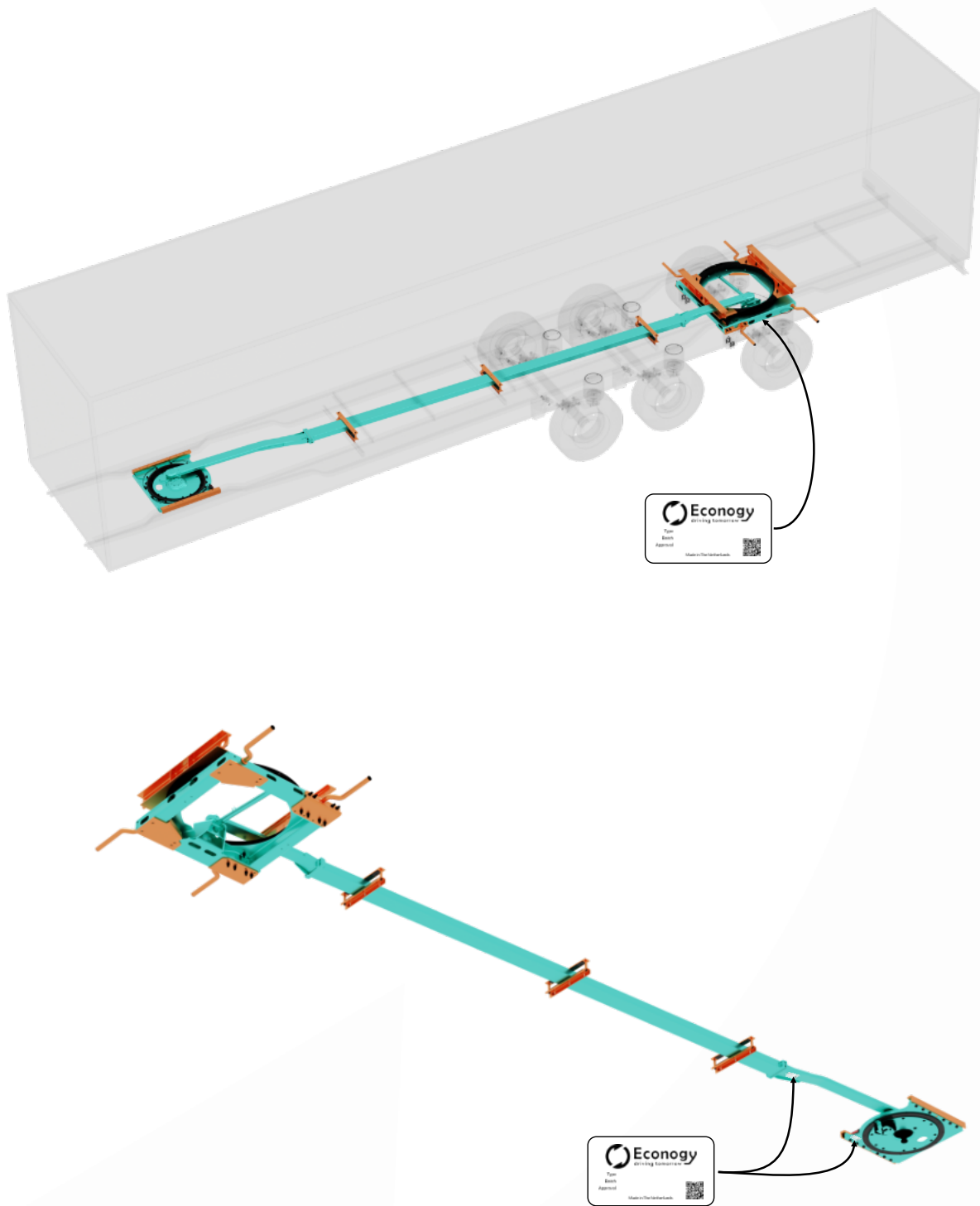


1.2 ySteer Modules



For more information about ySteer system composition refer to the system overview in appendix 6.1 and 6.2.

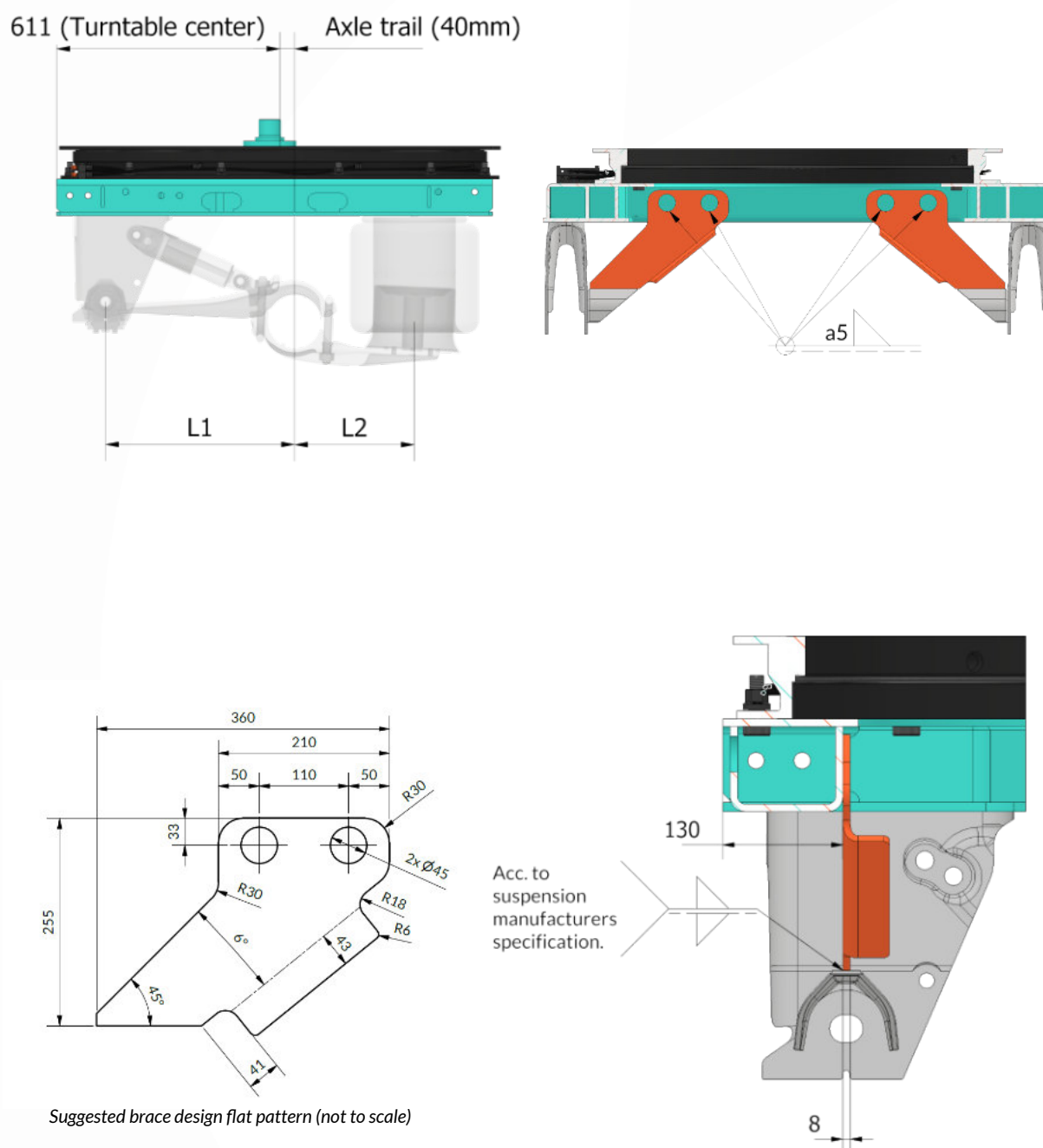
1.3 Type shield locations



For information about the ySteer type code system refer to the type code system table in appendix 6.3.

2. Preparation of the Axleunit

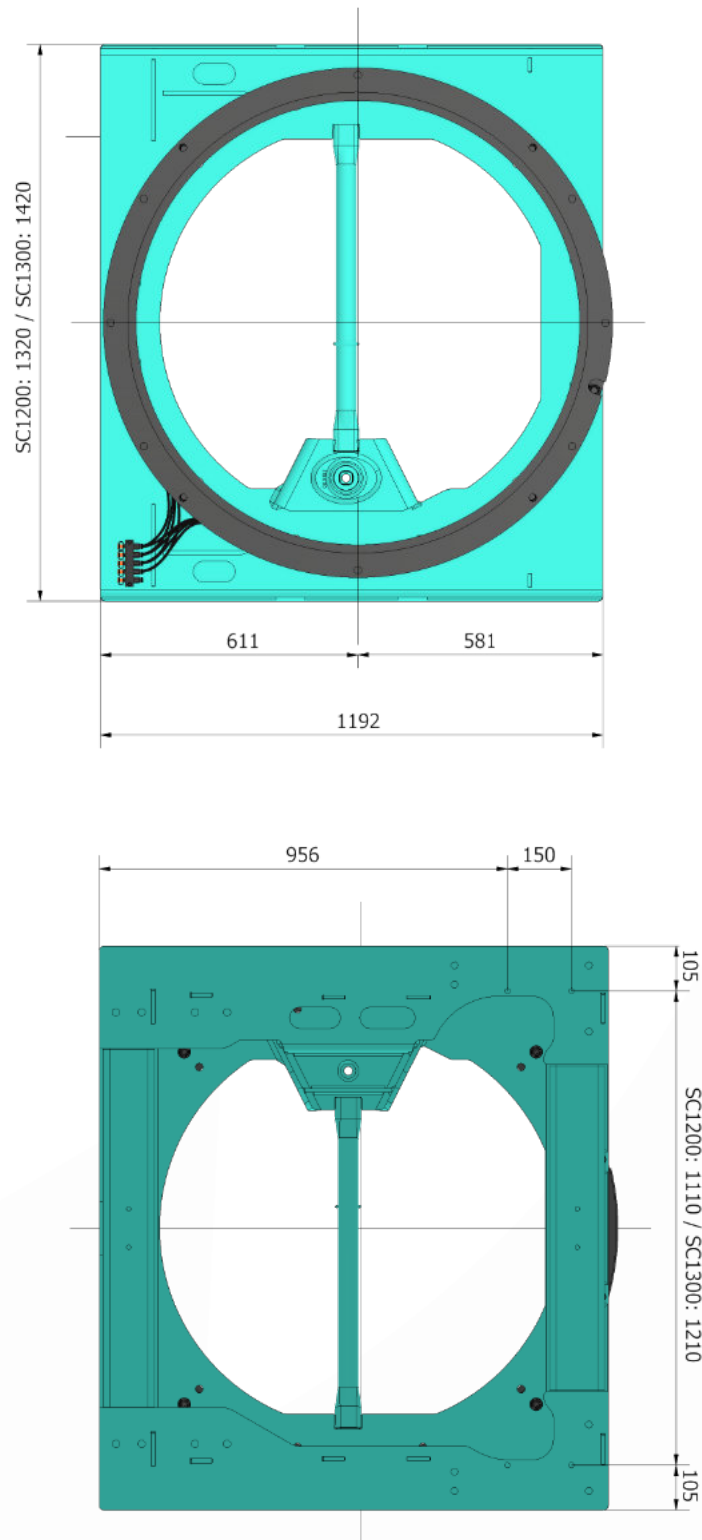
2.1 Hanger bracket bracing



This is a design suggestion, the final design depends on the used airspring system and remains the responsibility of the vehicle manufacturer.

2.2 (Pre-)drilled holes for the airbags

The subframe is prepared with predrilled air spring holes suitable for suspensions with $L2=380-385\text{mm}$ and offset 20-30mm. Mounting holes for other air suspensions must be drilled into the subframe by the vehicle manufacturer.

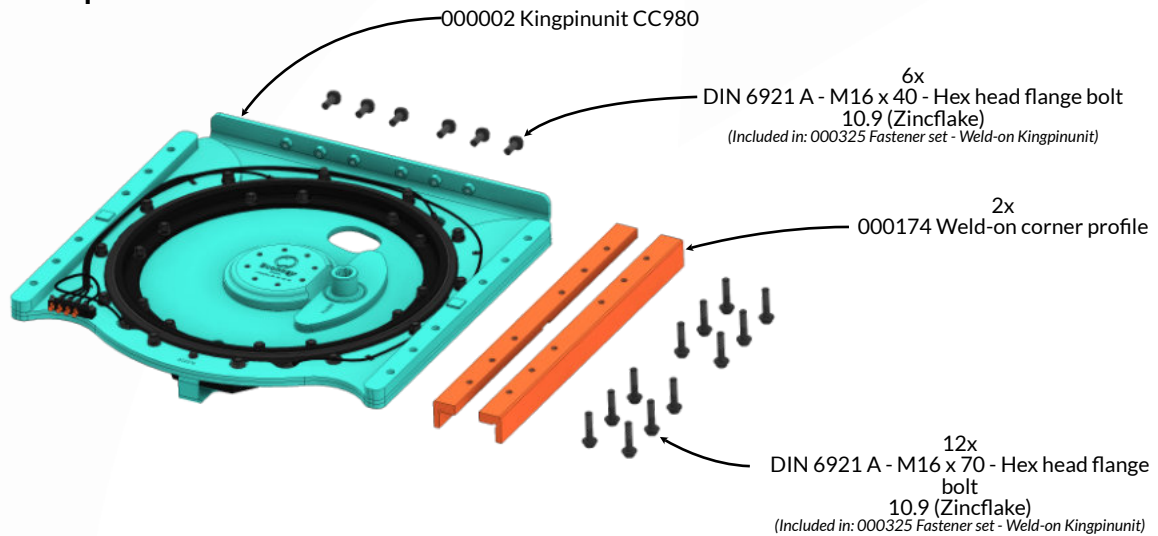


3. Installation

Before starting installation of the ySteer steering system always make sure that the items delivered match the items in the delivery note. Read through the paragraph(s) and check if all the required items for the installation are all present.

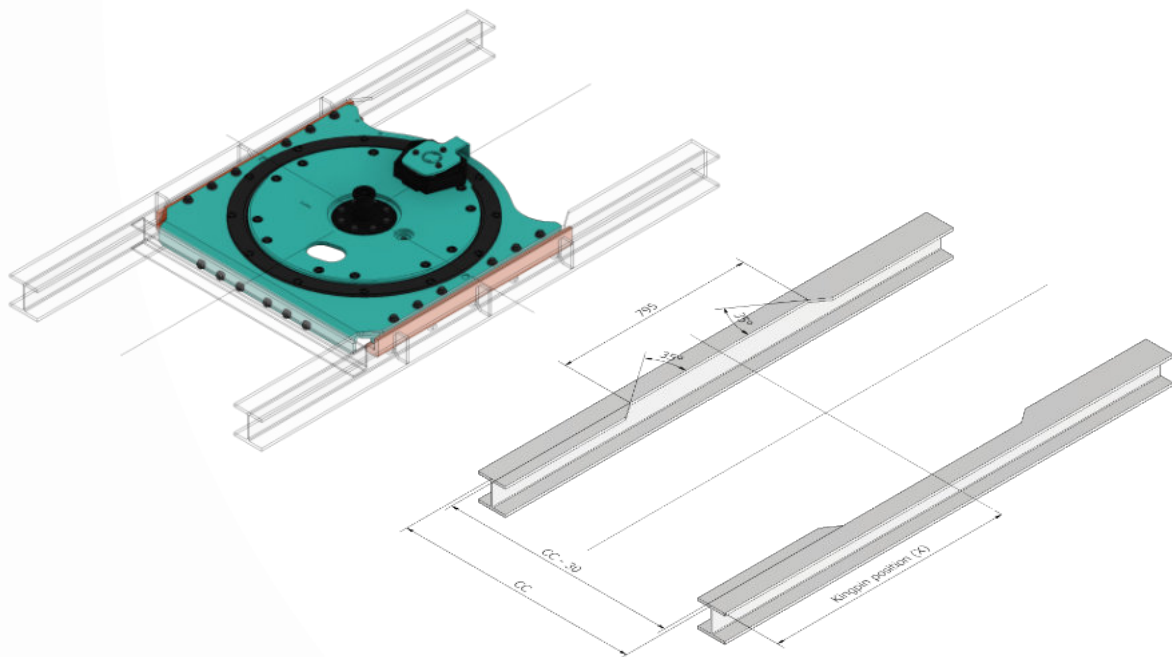
3.1 Installing the Kingpinunit (Weld-on type)

Parts required



Preparing the chassis

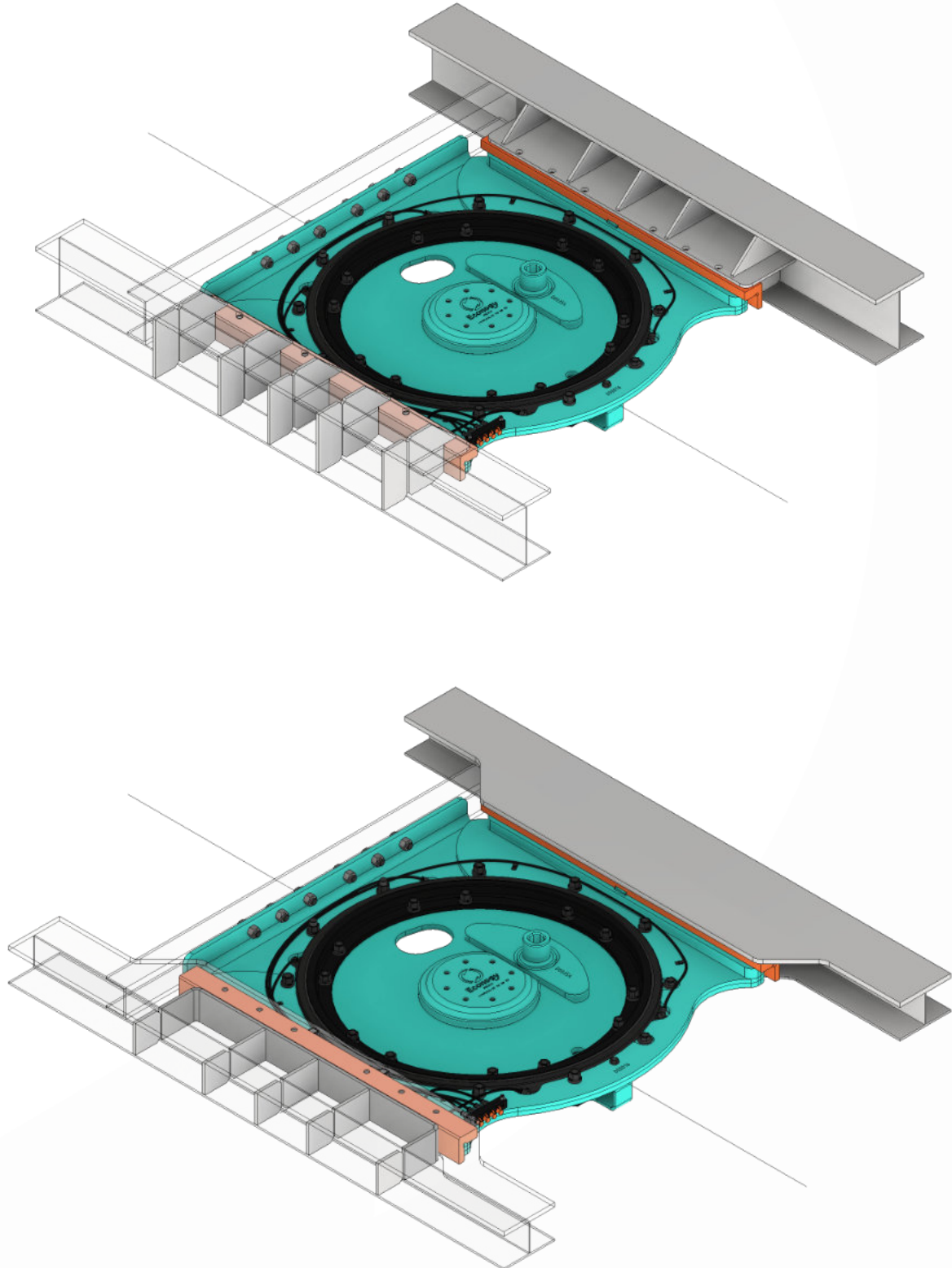
To be able to fit the kingpinunit, the following cutouts can be made in the bottom flanges of the (existing) trailer chassis. Alternitavely, the chassis could be designed to accomodate the kingpinunit.



This is a design suggestion, the final chassis design depends on the use-case and remains the responsibility of the vehicle manufacturer.

Adapting a wider chassis

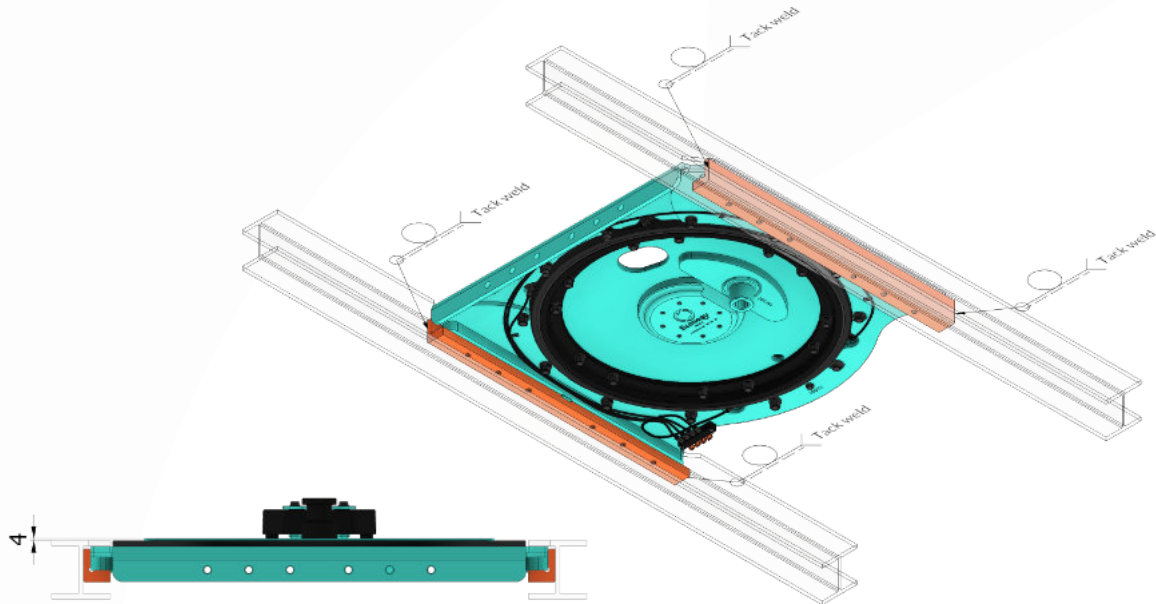
Adapting a wider chassis by narrowing the neck section or welding in consoles is possible as well, as long as the weld-on corner profiles are well supported.



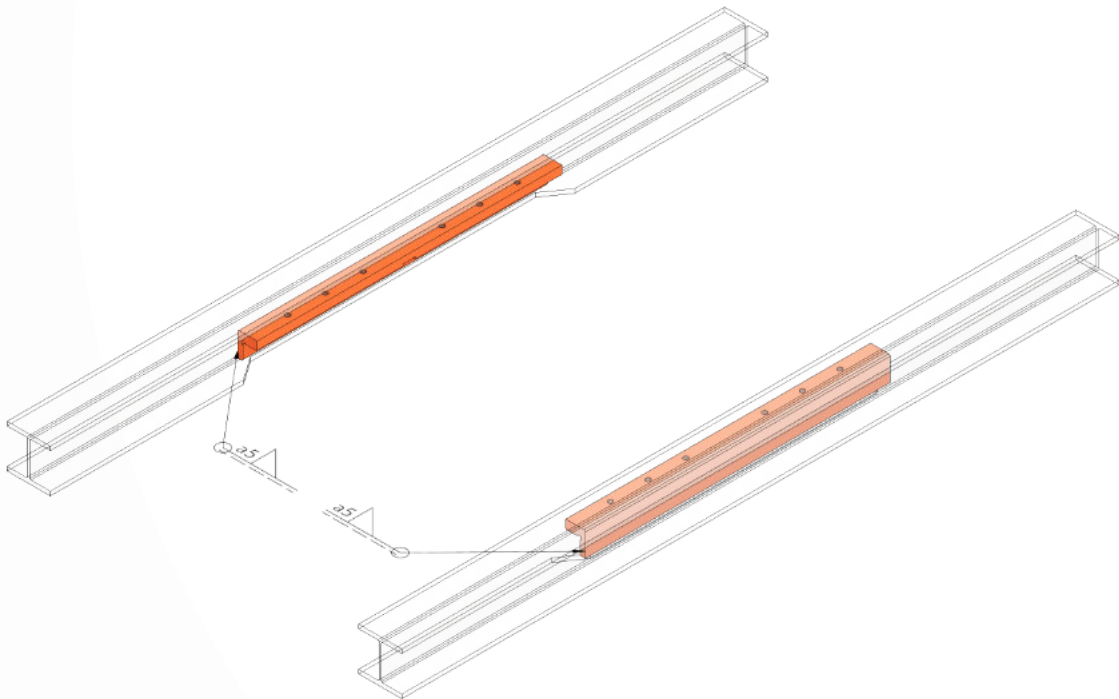
This is a design suggestion, the final chassis design depends on the use-case and remains the responsibility of the vehicle manufacturer.

Welding the corner profiles

Using the kingpinunit as a fixture to locate the weld-on corner profiles. Tack weld the corner profiles in position. Alternatively a dedicated fixture can be used as well. The skidplate surface that contacts the fifth wheel should be offset **4mm** from the bottom flange of the chassis.



After tack welding the corner profiles in place, remove the kingpinunit/fixture from the chassis and fully weld the corner profiles to the chassis, all around where possible.

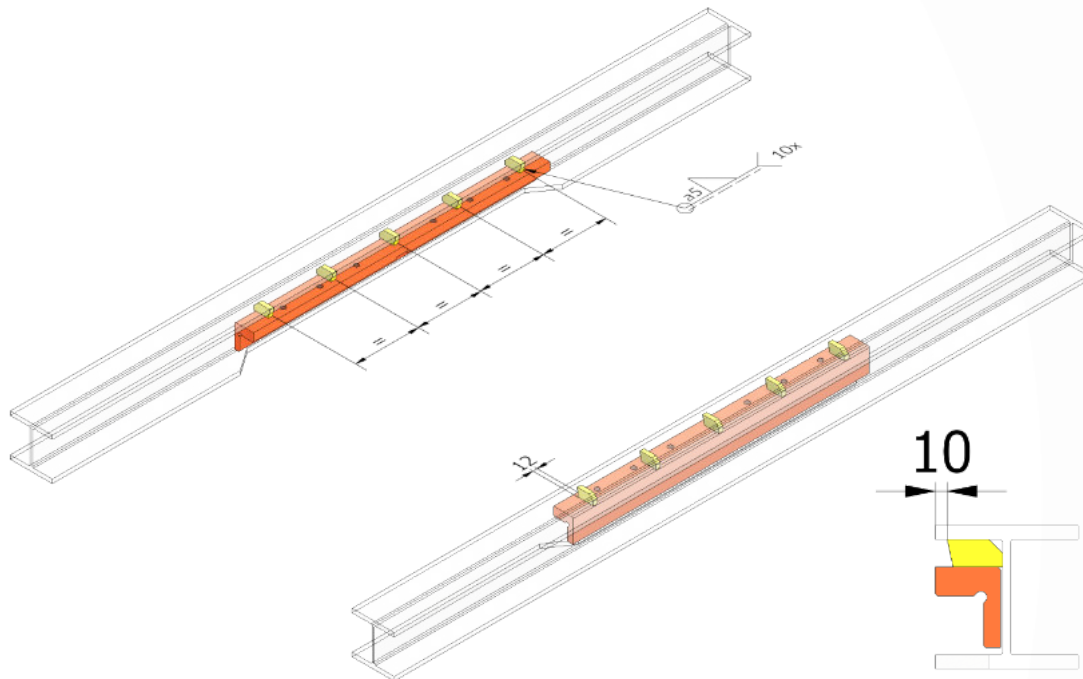


All parts that require welding should be fully welded all around where possible!

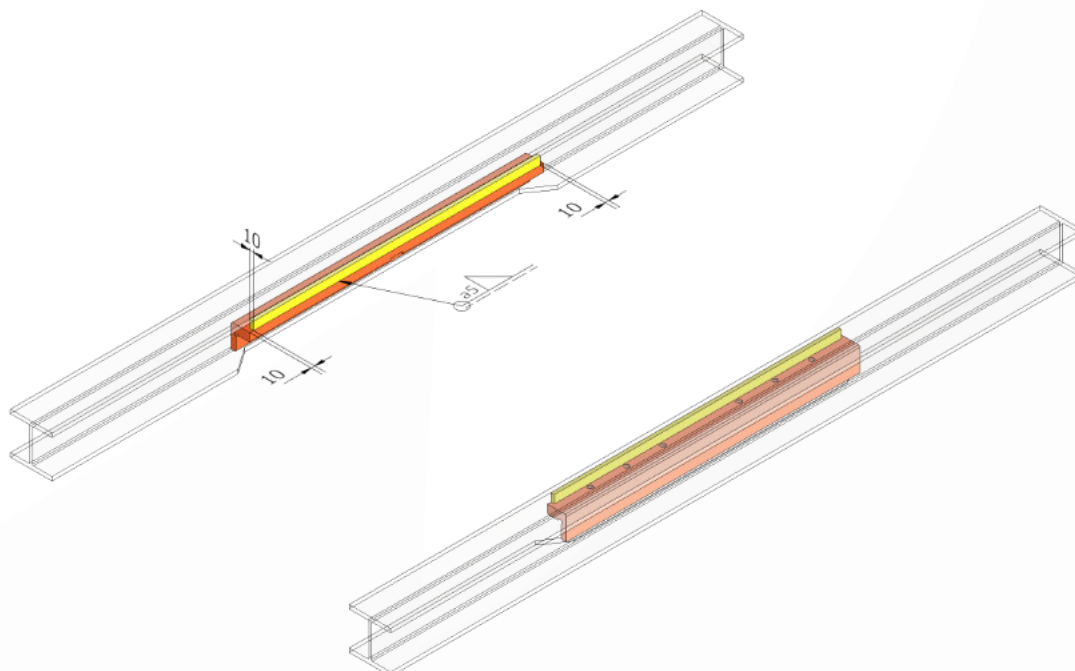
This is a design suggestion, the final chassis design depends on the use-case and remains the responsibility of the vehicle manufacturer.

Supporting the corner profiles

The corner profiles should be well supported by the chassis top flange. This can be achieved by welding 5 equally spaced gussets between the corner profile and the inside of the chassis top flange.



Alternatively, welding a strip lengthwise between the corner profile and the chassis top flange can support the corner profile as well.

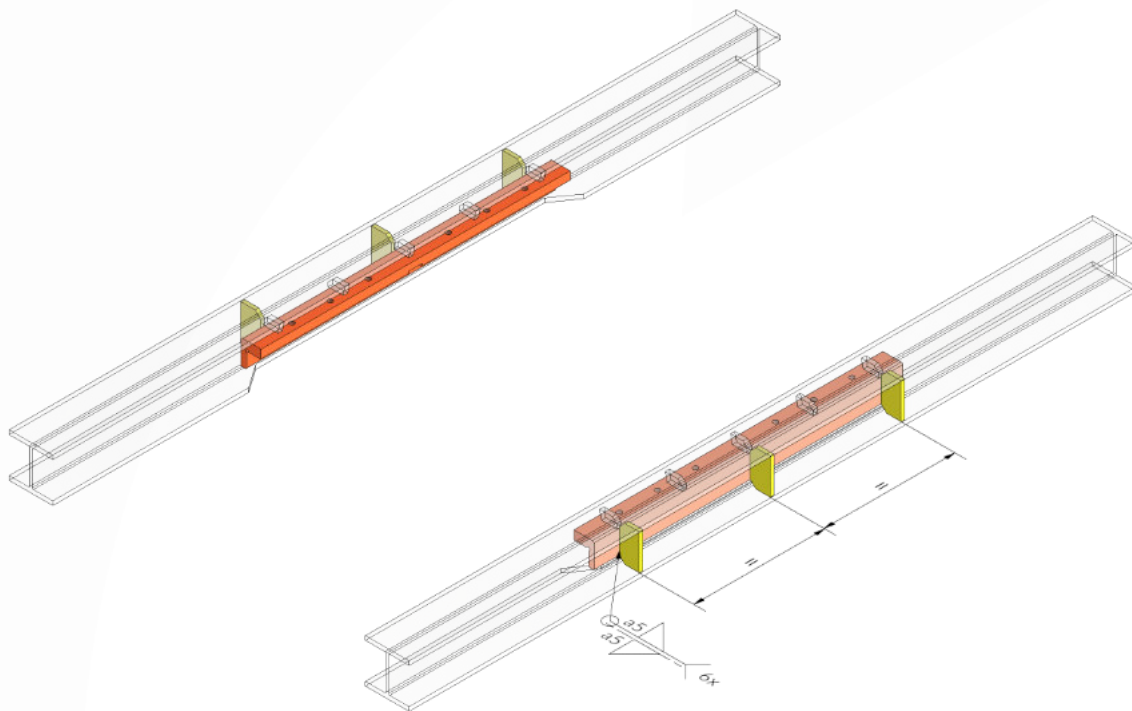


All parts that require welding should be fully welded all around where possible!

This is a design suggestion, the final chassis design depends on the use-case and remains the responsibility of the vehicle manufacturer.

Backing support for the corner profiles

To improve chassis stiffness and support it is recommended to add (at least) 3 gussets on the outside of the chassis. Preferably in line with the support gussets from the previous step.

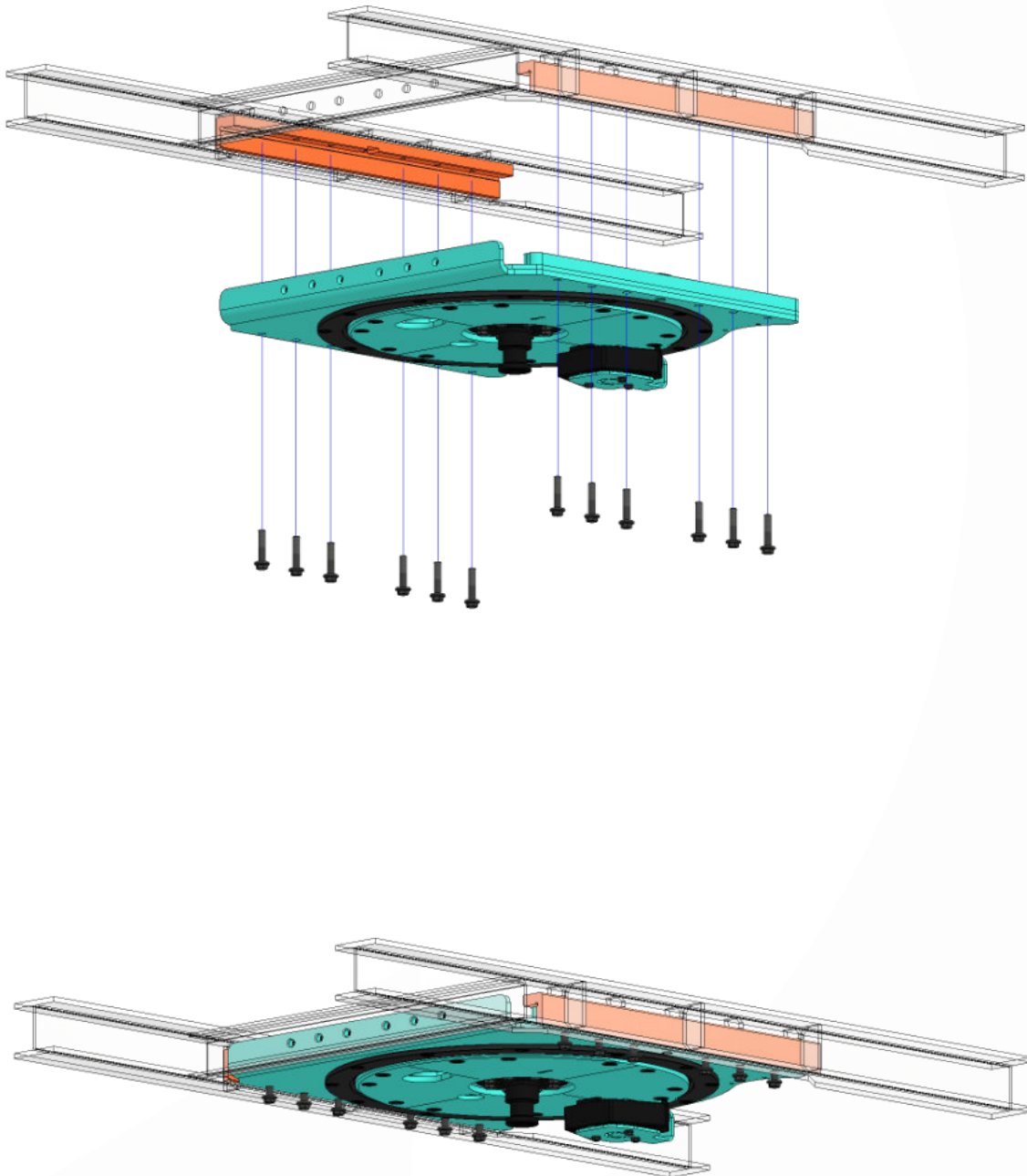


All parts that require welding should be fully welded all around where possible!

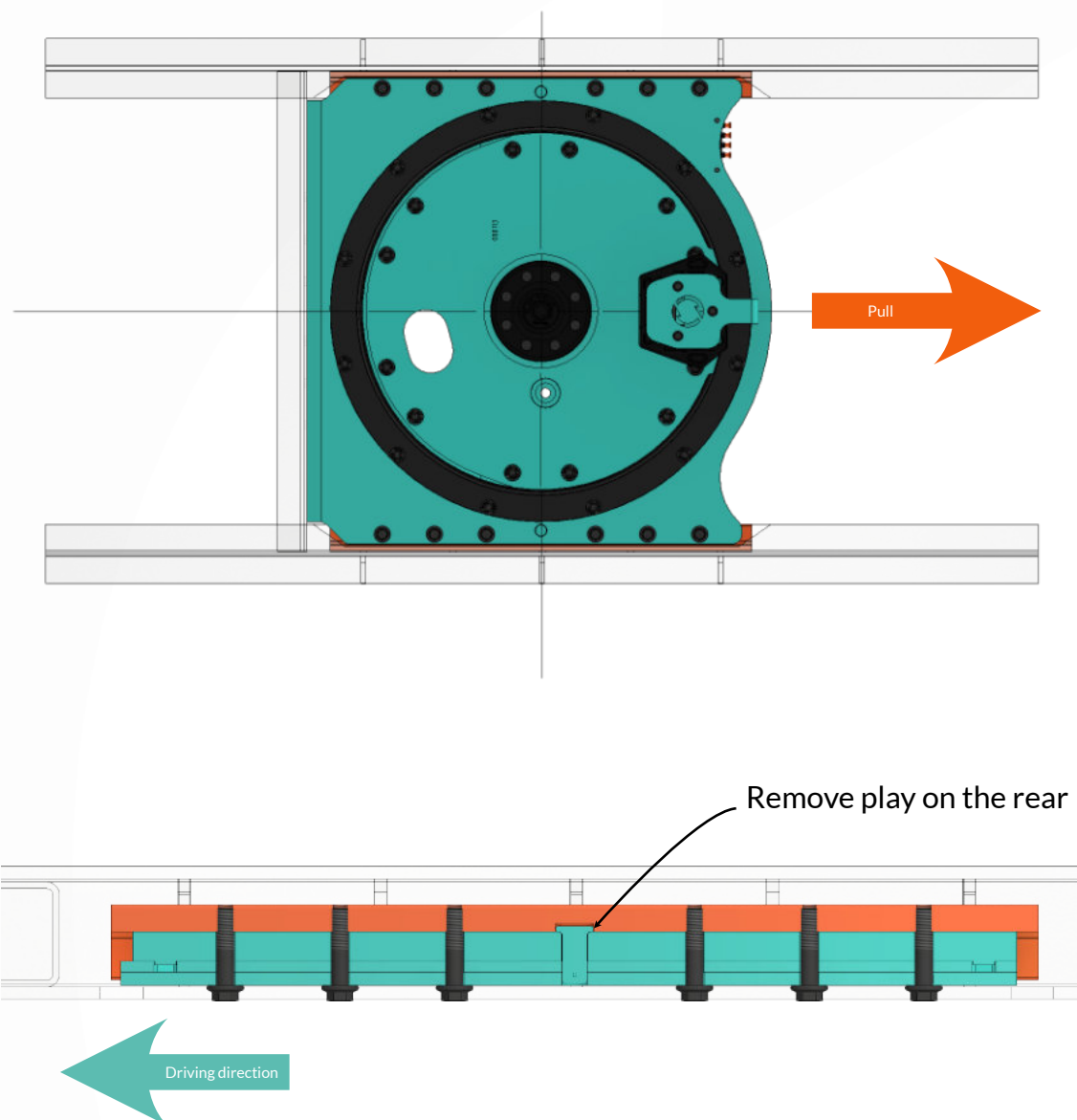
This is a design suggestion, the final chassis design depends on the use-case and remains the responsibility of the vehicle manufacturer.

Mounting the kingpinunit

Position the kingpinunit in the chassis and insert the M16x70 bolts *loosely*.

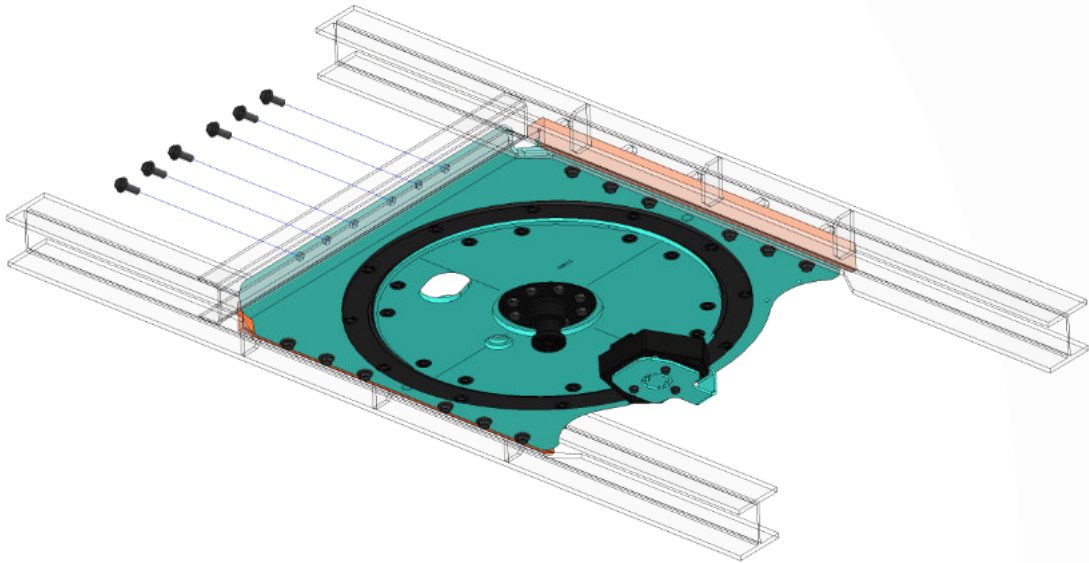


Shift the kingpinunit to the rear to remove any play from the fixing pins that engage in the slot of the corner profiles.



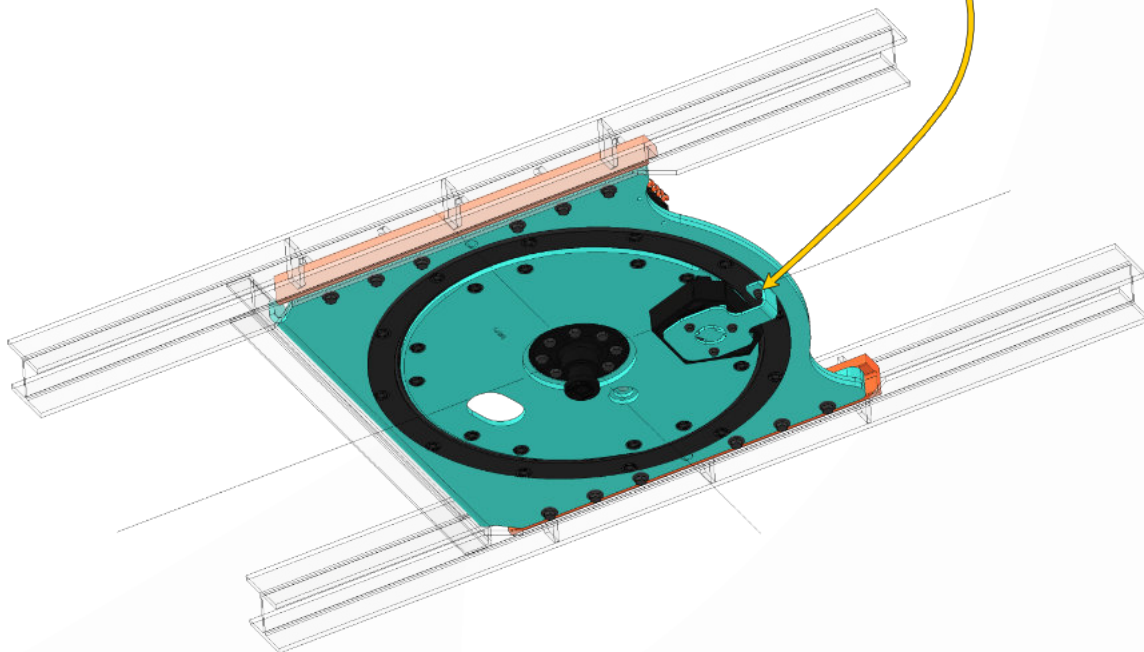
Tighten the M16x70 bolts to **300Nm** in a cross-wise pattern.

Insert the M16x40 bolts on the front and tighten to **300Nm**.



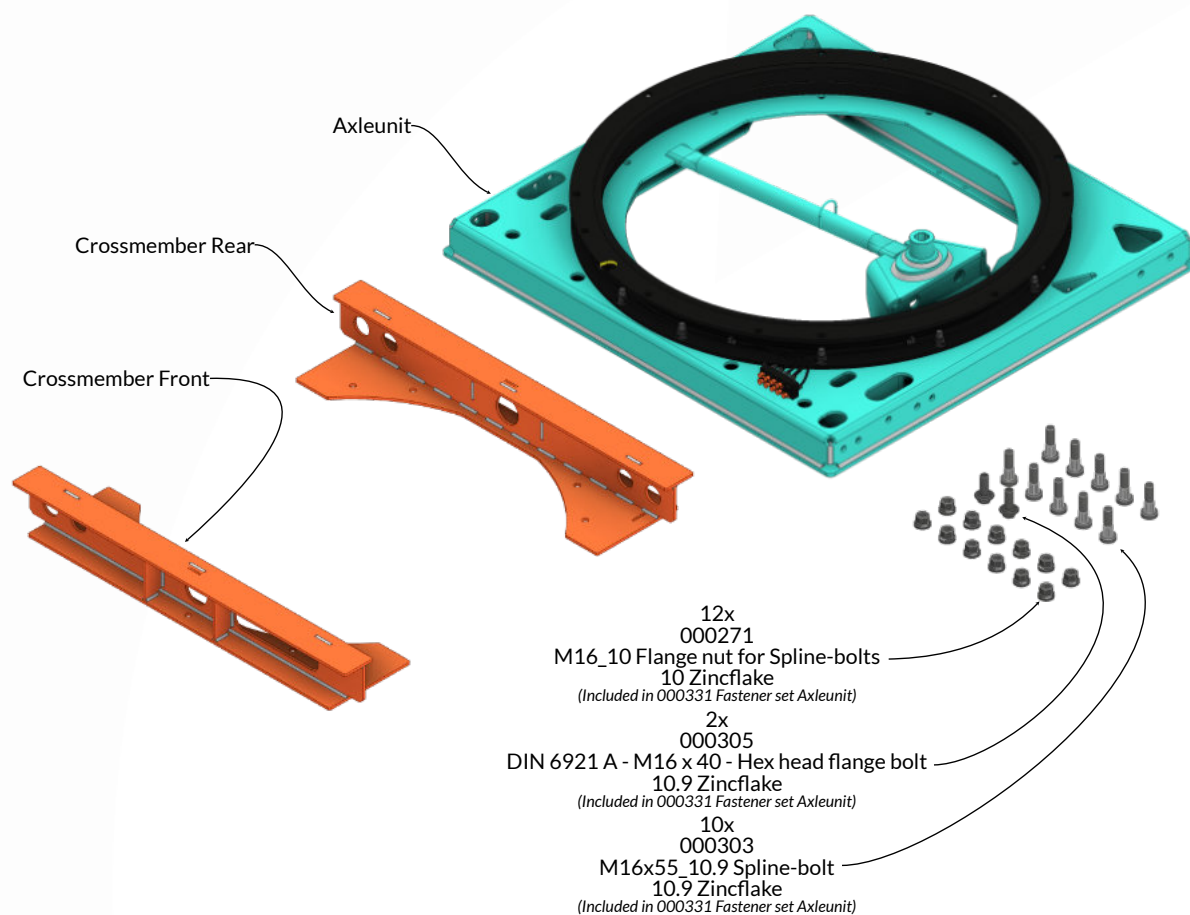
The rotation of the kingpinunit is blocked by a M10x60 bolt.

Ensure this bolt is removed after aligning the rear axle!



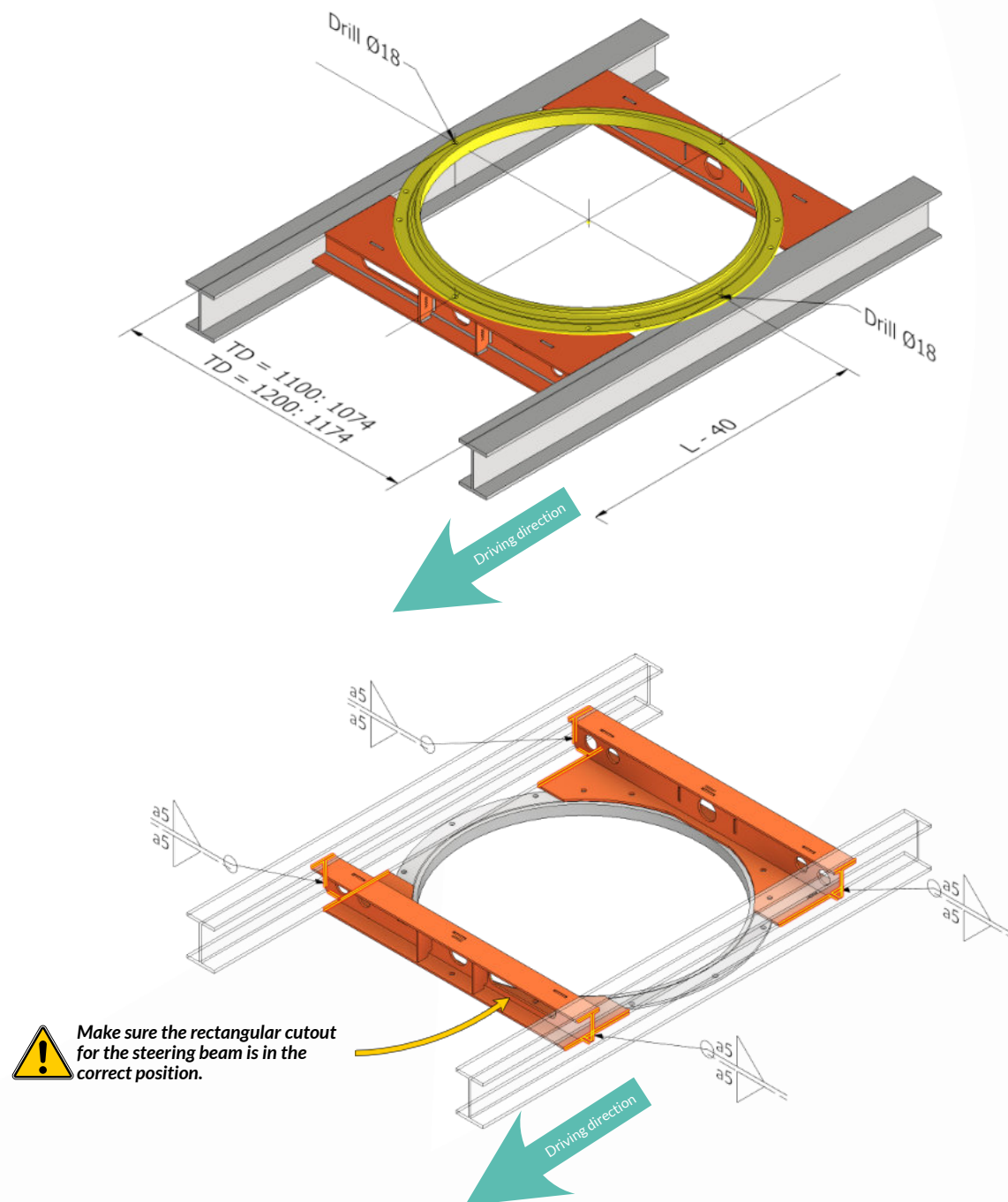
3.2 Installing the Axleunit

Parts required



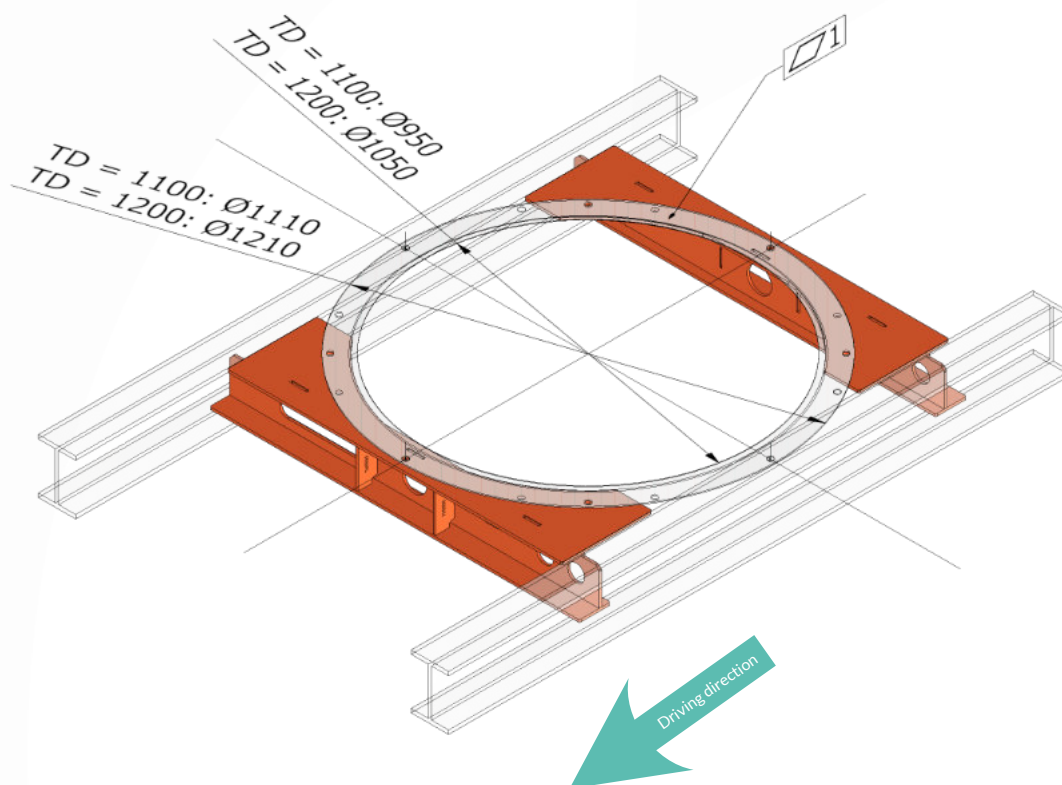
Preparing the chassis

To be able to fit the Axleunit, crossmembers are (usually) welded into the trailer chassis. These crossmembers contain holes for mounting the axleunit turntable. Two additional holes are then drilled into the chassis flanges at the 3- and 9 o'clock positions. Using a fixture to position the crossmembers is recommended. A used turntable can be used as a fixture as well.



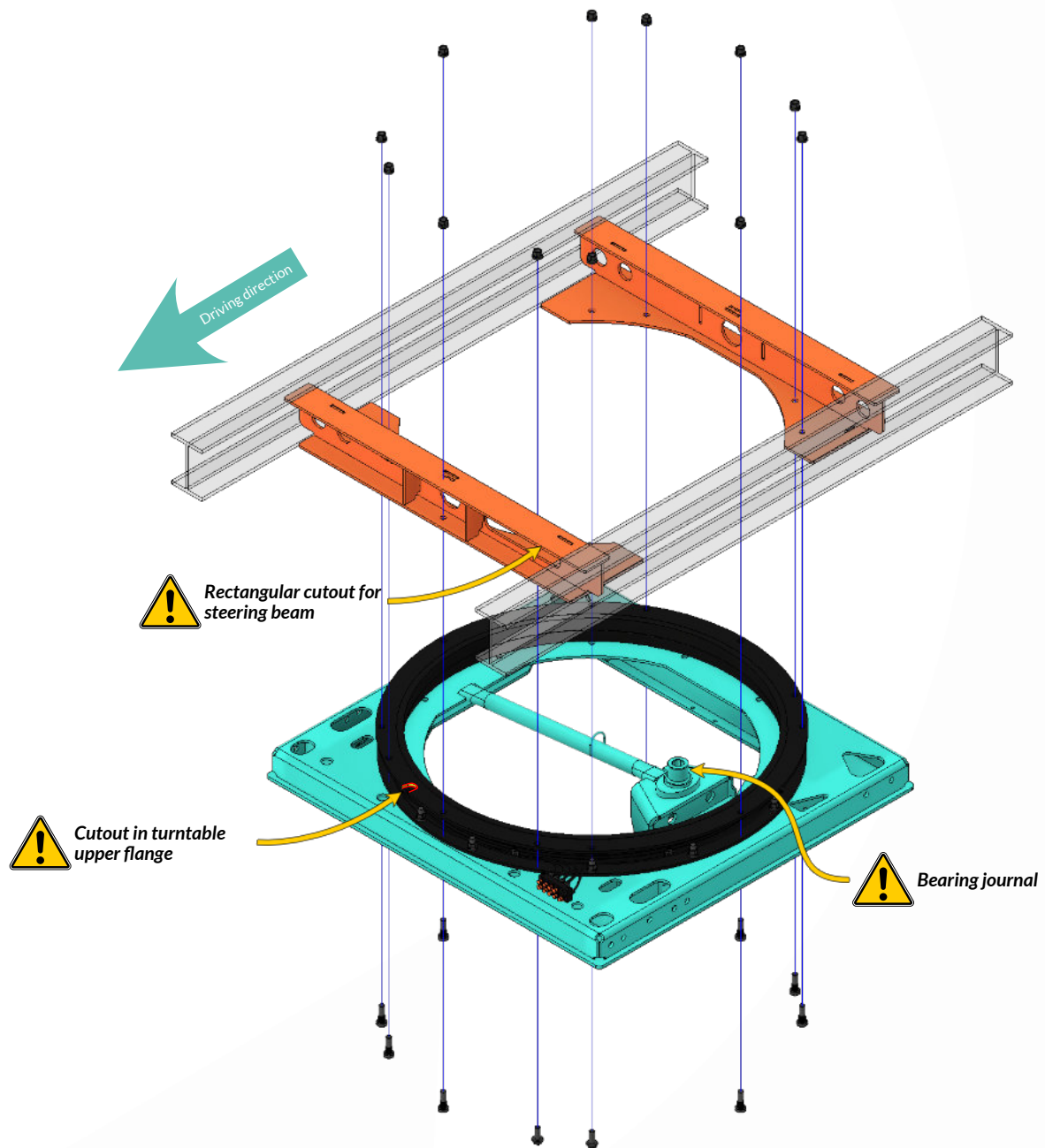
! All parts that require welding should be fully welded all around where possible!

To ensure the proper operation of the steering system and achieve the desired lifetime of the turntable it is important that the mounting surface for the turntable is flat. Be sure to grind down any protruding welds, burrs and other high spots. Check the surface with a straight-edge before continuing to mount the Axleunit.

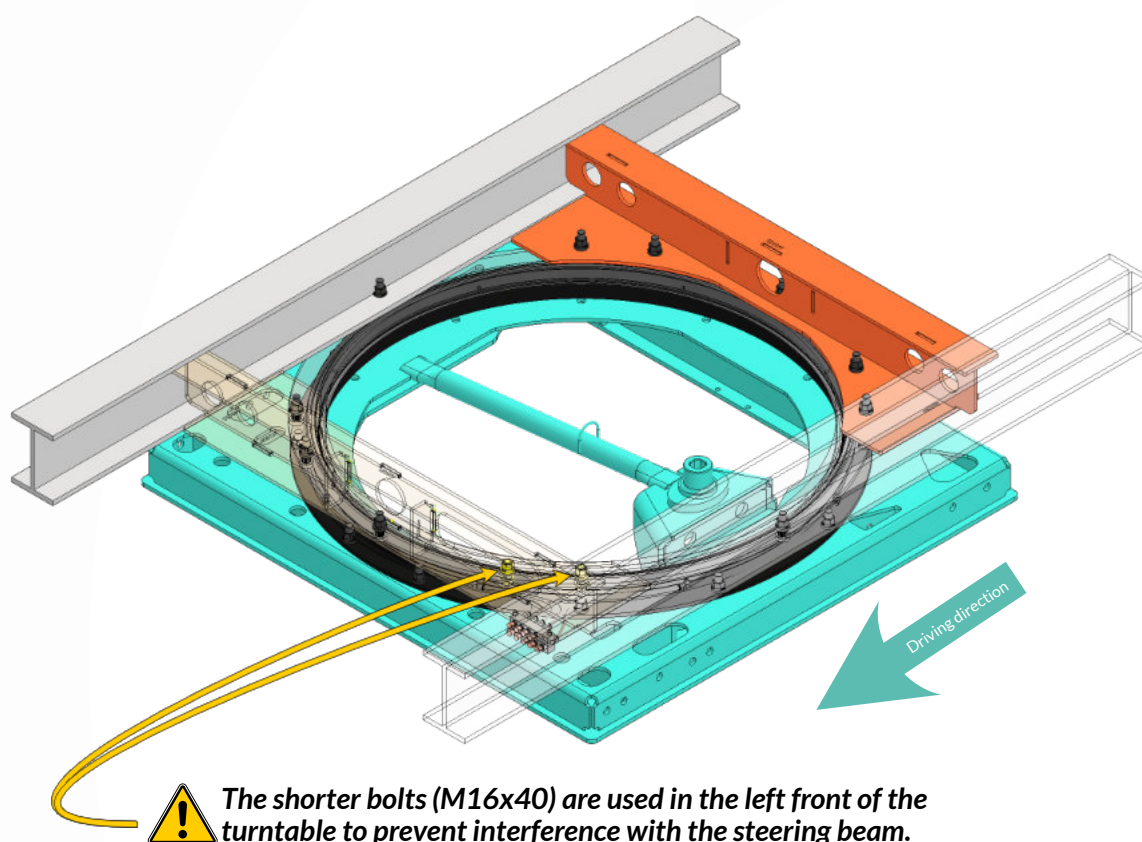


Installation

Position the Axleunit against the chassis and crossmembers. Ensuring the correct location of the features called out in the figure below.

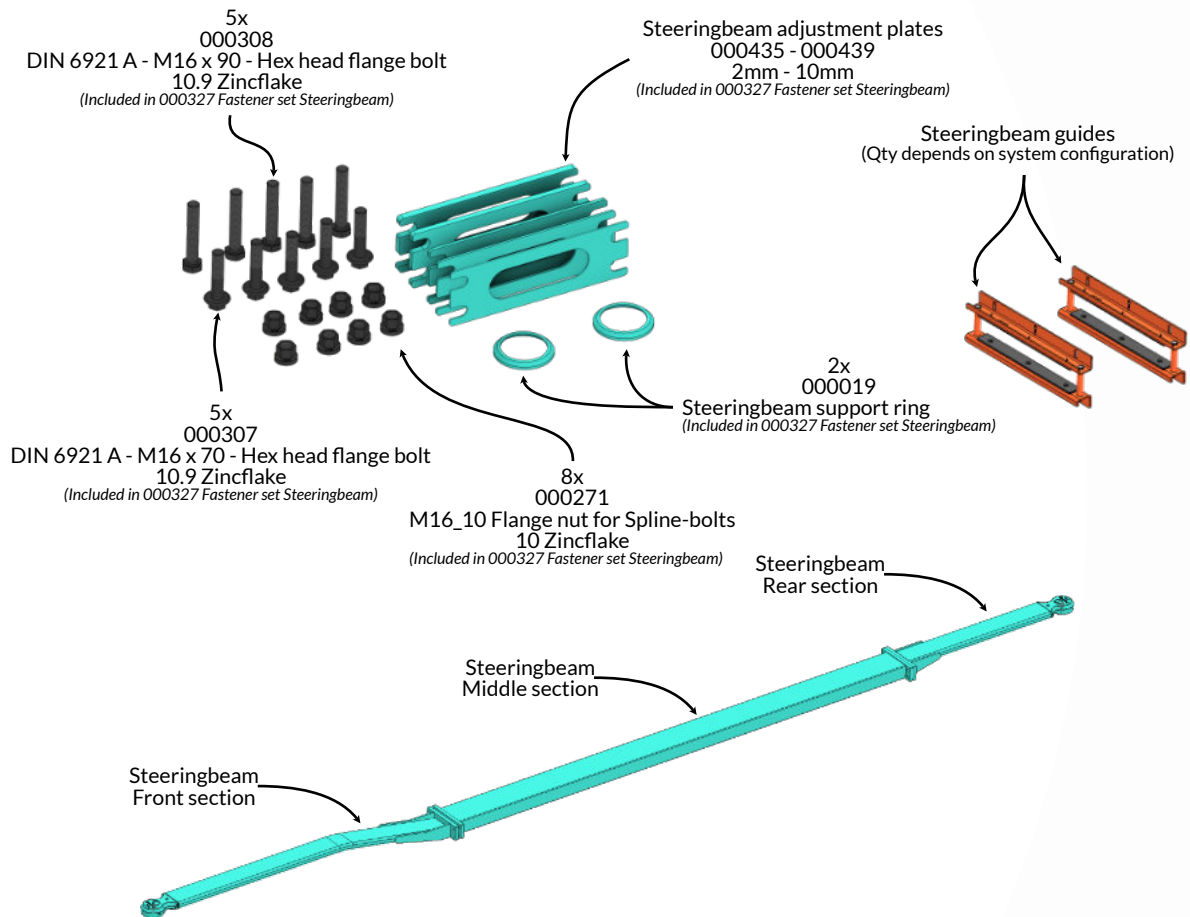


Tighten the bolts connecting the turntable upper flange to the chassis to **300Nm** in a **crosswise** pattern.



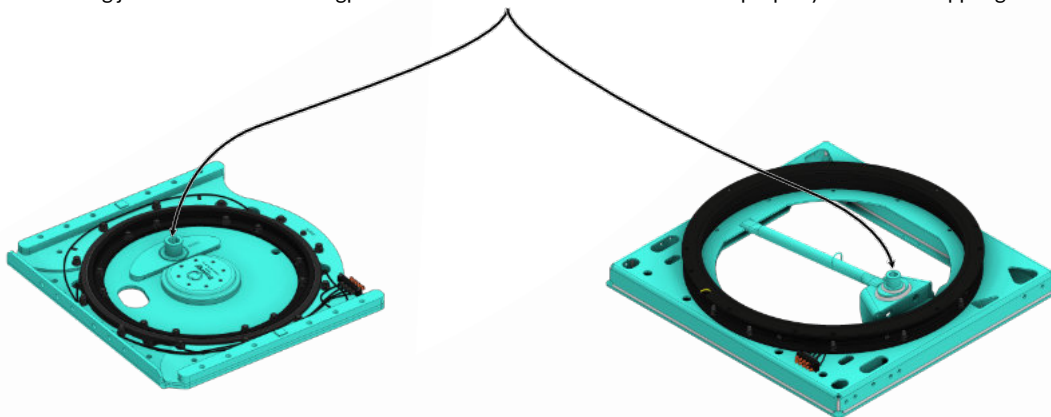
3.3 Installing the steering beam

Parts required

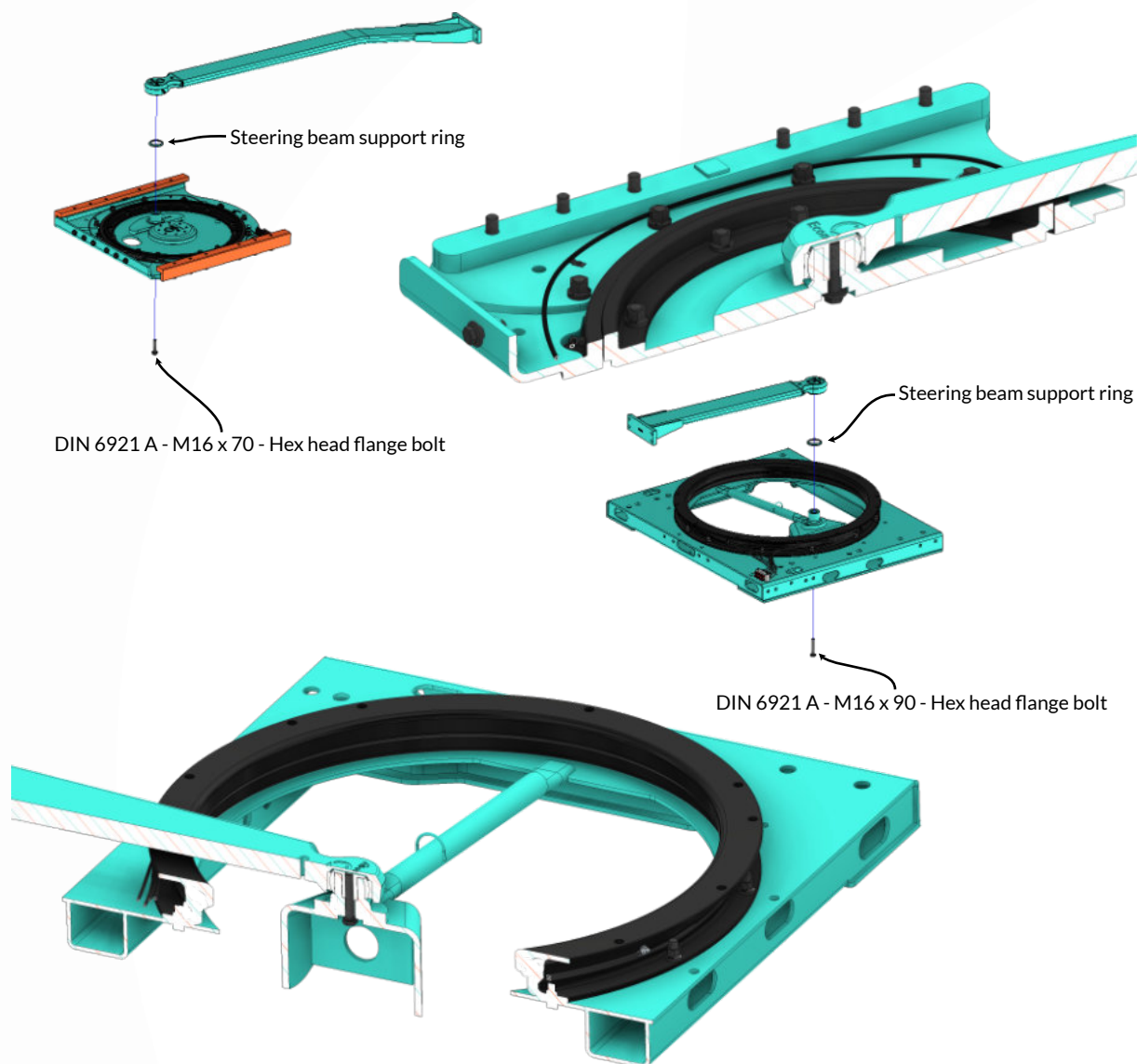


Preparation

Ensure the bearing journals on both the kingpinunit and axle unit are free of debris and properly covered in copper grease.



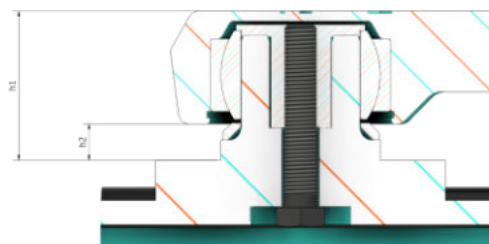
Front and Rear section installation



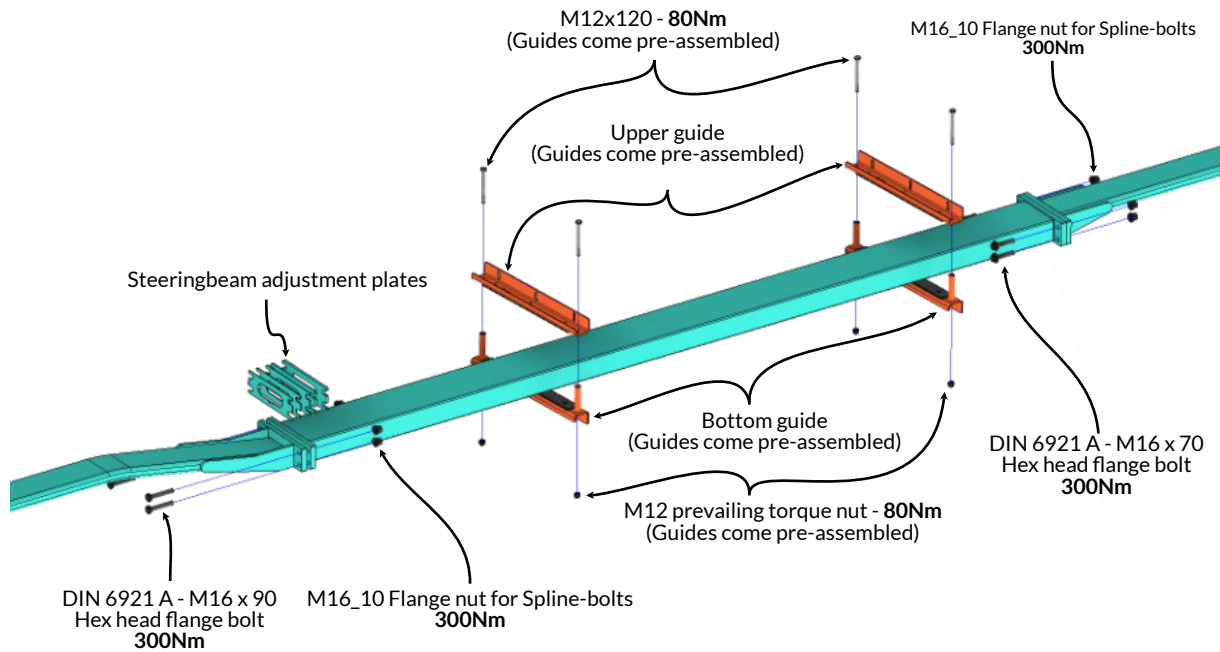
1. Fasten until bearing, support ring and plate are abut to each other.
2. Double check height **h1** and **h2**. (See value below)
3. Then turn another **120°** (Max 300Nm)

Kingpinunit: h1 = 64mm / h2 = 8mm
Axle unit: h1 = 74mm / h2 = 18mm

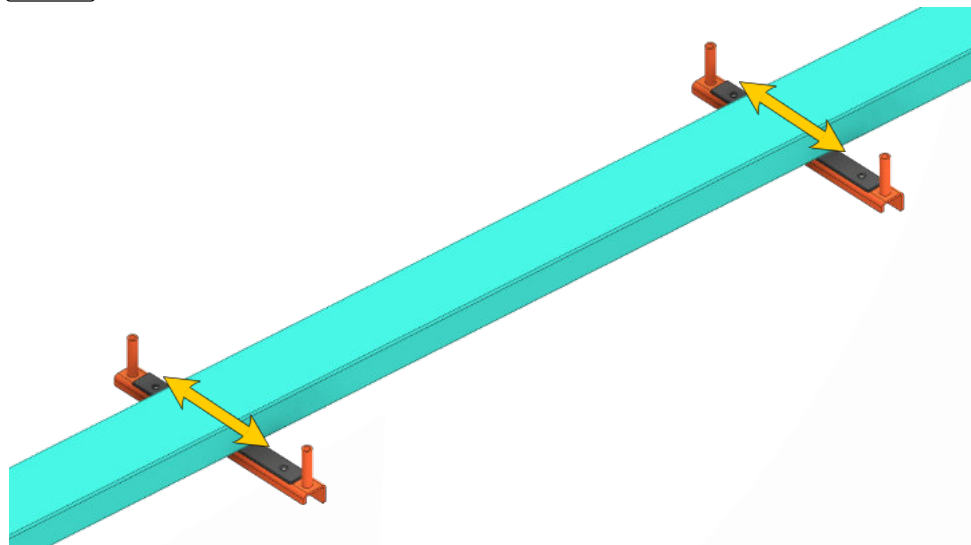
M22x1.5 threaded clearance hole
Can be used to dismount the steering beam by inserting a M22x1.5 bolt that pushes the bearing assembly off of the bearing journal



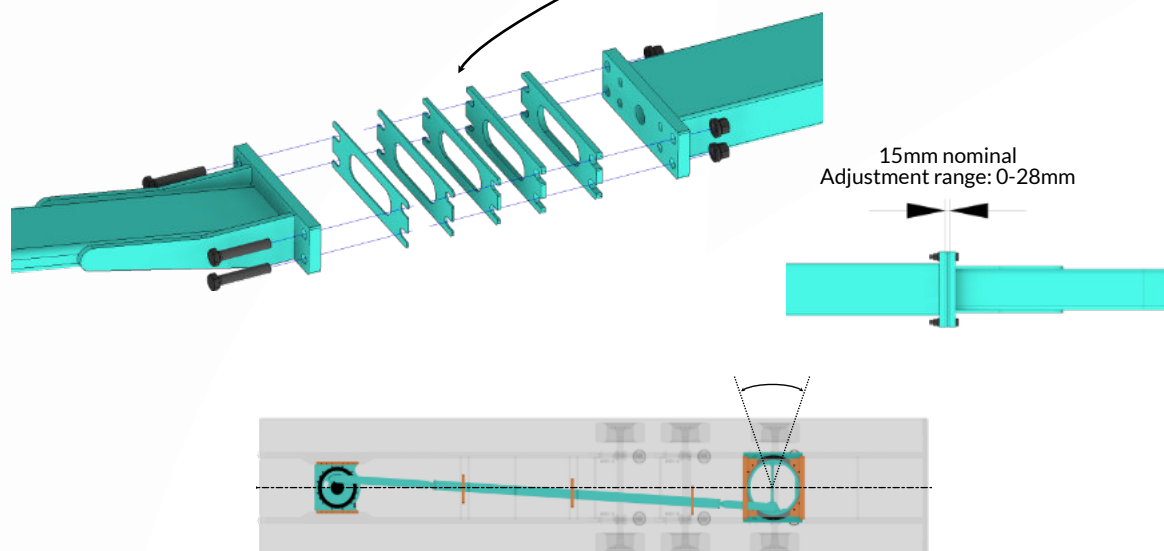
Middle section installation



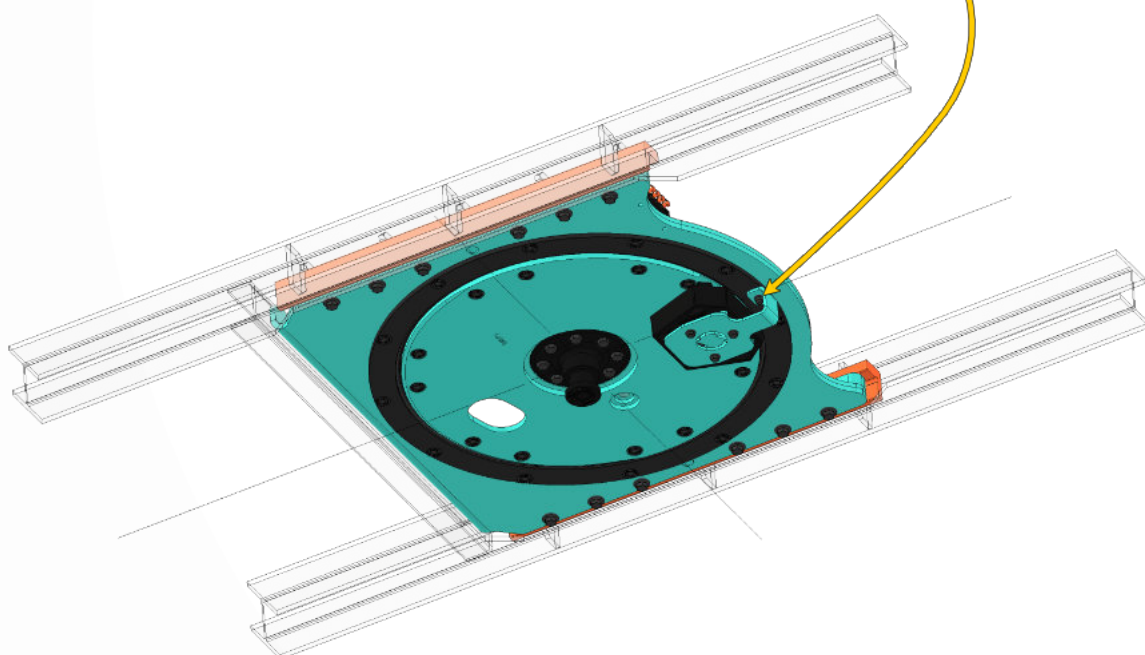
Ensure the steeringbeam has room in the guides to slide sideways!



Mix and match adjustment plates for axle alignment.



The rotation of the kingpinunit is blocked by a M10x60 bolt.
Ensure this bolt is removed after aligning the rear axle!



4. Entering service

Before the vehicle enters service, make sure the following steps are completed.

Label masking

The type shields attached to the ySteer modules come with a transparent masking foil pre-attached. Make sure these are removed before commissioning the vehicle.
(See 1.4, pg6 for type shield locations)

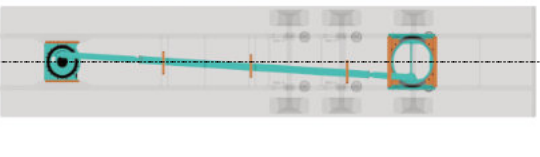


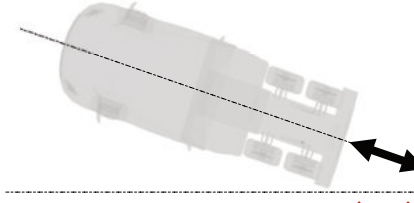
Warning sticker

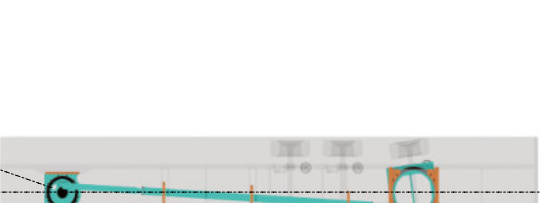
The warning sticker should be attached to the headboard of the semi-trailer.














WARNING!


ACHTUNG!


LET OP!


ATTENTION!


OSTRZEŻENIE!

STRAIGHT COUPLING AND DECOUPLING ONLY!

NUR GERADES AN- UND ABKUPPELN!

ALLEEN RECHT AAN- EN AFKOPPELEN!

COUPLAGE ET DÉCOUPLAGE DROITS UNIQUEMENT!

TYLKO PROSTE SPRZĘGANIE I ROZŁĄCZANIE

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Lubrication

The most commonly used grease is lithium based (Ep) and corresponds to the following standard:

- DIN 51825 K2K – 20 ed ISO L-X-BCHA2.

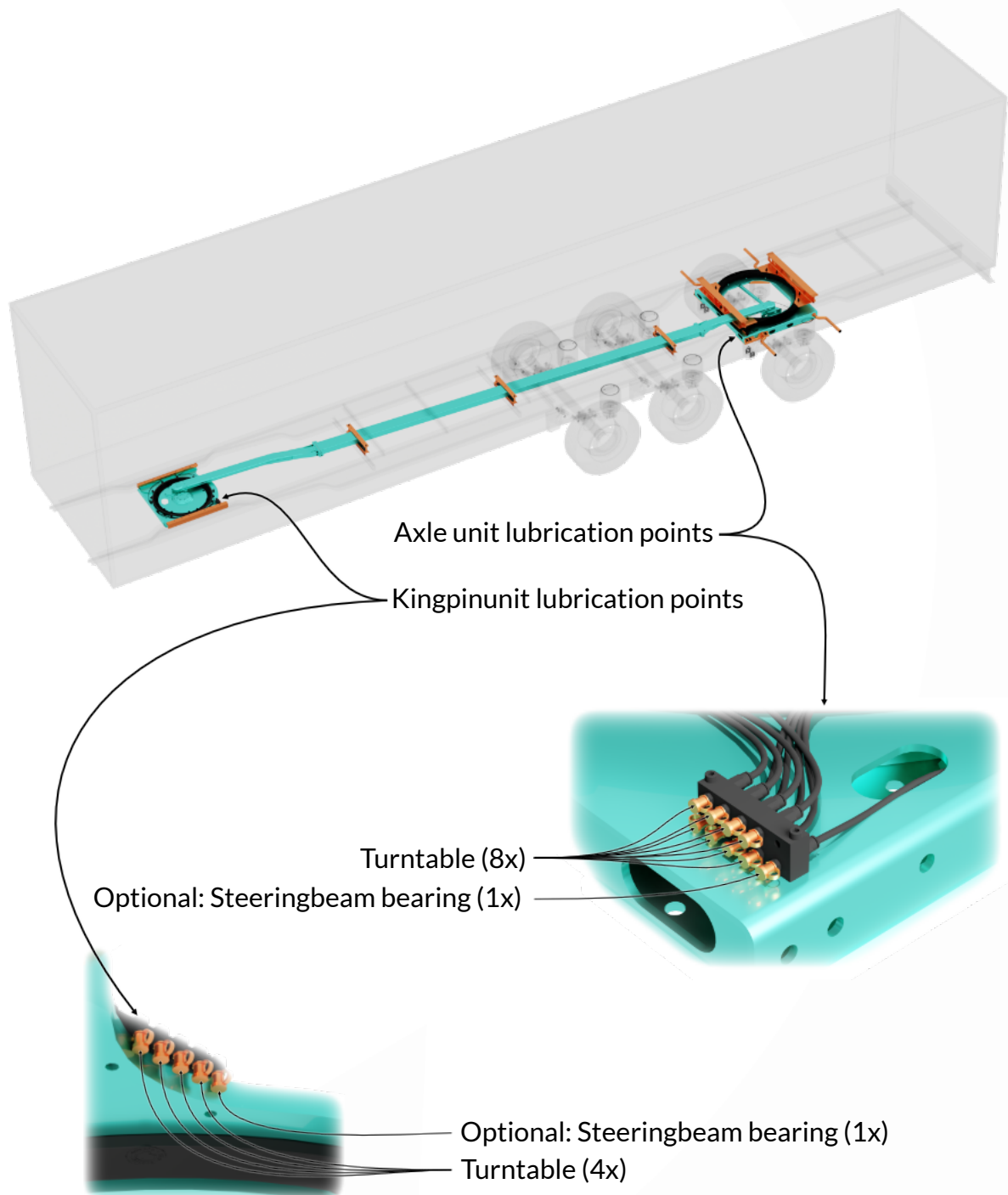
It is also possible to use equivalent greases. The operating temperatures are between -20° C and +120° C. For low temperature applications, special greases must be used. The greasing must be completed as per the slewing rings application. Listed below are some of the equivalent greases recommended:

- ESSO EP2
- Beacon EP2
- MOBIL EP2
- Mobilux EP2
- AGIP EP2
- GRMU EP2
- SHELL EP2
- Calithia EP2



ySteer modules come pre-greased with Total BIOMULTIS EP 2 upon delivery.

Lubrication point locations



5. Appendix

5.1 Type code system

Description					X		XX		X		XXXX		X		XX		X		X		
Trailer																					
Model		ySteer		yS																	
Qty of steered axes		1		1																	
		2		2																	
		X		X																	
Toatal qty of steered and rigid axes		1		1																	
		2		2																	
		3		3																	
		4		4																	
Kingpin unit																					
1. Kingpin unit	Offset OS (mm) x steering angle SA	140	21°				21														
		165	26°				26														
		175	28°				28														
		185	30°				30														
		195	32°				32														
		215	36°				36														
		235	40°				40														
	Kingpin manufacturer	Econogy					E														
		SAF-Holland					S														
		Jost					J														
Assembled mounts		Bolt-on					B														
2. Loose kingpin unit mounts		Weld-on					W														
		Bolt-on						B													
		Weld-on						W													
3. Fastener set - Kingpin unit		Without					X														
		Steering beam																			
4. Front section	Length FL x step FS (mm)	1563	0							A											
			45							B											
			63							C											
			75							D											
			93							E											
		1963	45						F												
			63						G												
Length ML (mm)		Fill in:	XXXXX							XXXXX											
5. Middle section	Step MS (mm)	0								A											
		74								B											
		110								C											
		140								D											
6. Rear section	Length RL x step RS (mm)	1095	-98							A											
			-93								B										
			-63								C										
			-39								D										
			-1								E										
			28								F										
			63								G										
			93								H										
7. Fastener set - Steering beam		With											F								
		Without												X							
8. Guides	Qty x type	2	Standard											A							
		3									B										
		4									C										
		2	Flat												D						
		3													E						
		4														F					
		Without											X								
Axle unit																					
9. Axle unit	Spring centre SC (mm)	980												98							
		1200												12							
		1300												13							
	Coating	KTL / Cathodic dip coated														K					
		Hot-dip galvanized														G					
Turntable diameter TD (mm)		1100															11				
		1200															12				
10. Fastener set - Axle unit			With															F			
		Without																X			
11. Crossmembers	Width CW x height CH x flange CF (mm)	970	140	120															A		
				140														B			
				150														C			
			170	120														D			
				140														E			
		1190	150															F			
			140	120															G		
				150															H		
				170															I		
				150															J		
		Without															X				
12. Mudguard supports	Qty x length ML (mm)	2	500																A		
		4															B				
		2	580															C			
		4																D			
		2	800																E		
		4																	F		
		Without																X			
13. Hangerbracket plates		Set with fasteners																		H	
		Set without fasteners																		F	
		Without																		X	
14. Air spring plates		Set with fasteners																		A	
		Set without fasteners																		F	
		Without																		X	

5.2 Inspection data

Kingpinunit				
Dimensions	Minimum	Maximum		
Steering Wedge vertical play	1 mm (new)	3 mm (replace)		
Turntable axial play	1 mm (new)	3 mm (replace)		
Bolts	Size	Tool	Tighten. Torque	Test Torque
Turntable bolts	M16	SW22	300 Nm	205 Nm
Chassis bolts	M16	SW22	300 Nm	205 Nm
Kingpin	M14	SW22	190 Nm	170 Nm
Steering Wedge	M10	SW17	55 Nm	45 Nm

Steering beam				
Dimensions	Minimum	Maximum		
Guide Wearplate thickness	3 mm (replace)	5 mm (new)		
Steering beam bearing radial play	0 mm (new)	1 mm (replace)		
Bolts	Size	Tool	Tightened	Test Torque
Steering beam flange bolts	M16	SW22	300 Nm	205 Nm
Steering beam bearing bolts	M16	SW22	300 Nm	205 Nm
Guide bolts	M12	SW19	95 Nm	85 Nm

Axle unit				
Dimensions	Minimum	Maximum		
Turntable axial play	1 mm (new)	3 mm (replace)		
Bolts	Size	Tool	Tightened	Test Torque
Turntable bolts	M16	SW22	300 Nm	205 Nm
Chassis bolts	M16	SW22	300 Nm	205 Nm

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no text or other markings on the paper.