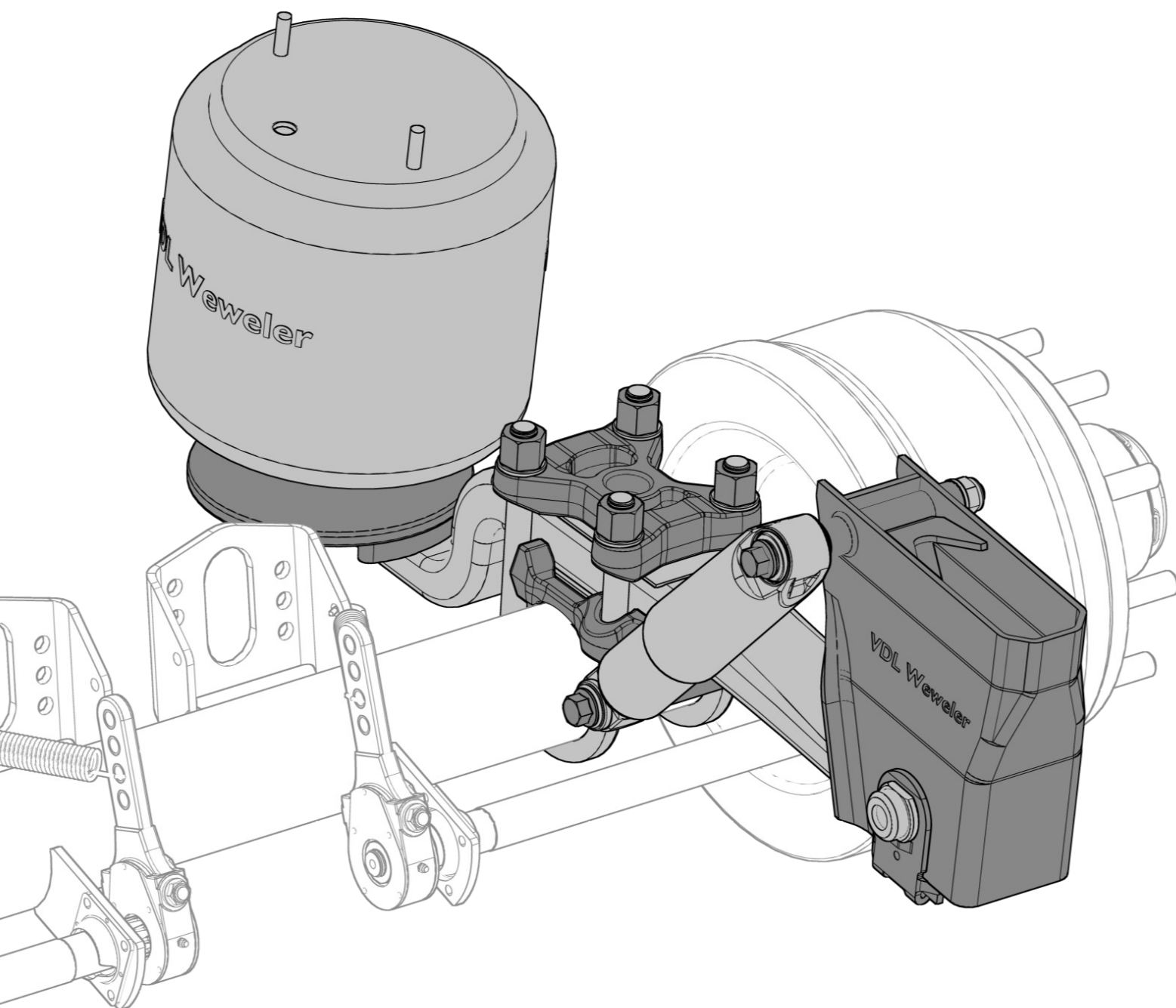


VDL Weweler



SUSPENSION INSTALLATION GUIDE



MBS-HD RANGE AIR SUSPENSION

DOCUMENT: SIG-HD-EN
DATE: 04-2021
REVISION: B

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Revision summary

Date	Revision	Comment	Author
March 2019	-	Initial version	RTS
July 2020	A	Shock absorbers added to section 6 overview. Updated weld instruction section 3.4. Updated tightening instructions section 10 (tolerance on M12 connections.) Updated warranty & liability referral. Updated standards. Updated paint section.	RTS
April 2021	B	Welding instruction casted bracing improved (section 3.6).	RTS

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Contents

	General notes.....	5
	Welding remarks.....	5
	Warranty and liability.....	5
	Pictograms & symbols.....	6
1	Explanation MBS-HD Air suspension system coding.....	7
2	Technical specifications / design information.....	8
3	Hanger brackets & pedestals.....	9
	3.1 Dimensions of hanger bracket & pedestal.....	9
	3.2 Alignment of hanger bracket	10
	3.3 Welding of hanger bracket.....	11
	3.4 Welding of pedestal.....	11
	3.5 Welding of plate for hanger bracket bracing.....	12
	3.6 Welding of casting for hanger bracket bracing.....	12
	3.7 Welding of wear plates after alignment.....	13
4	Axle seats.....	14
	4.1 Welding of standard axle seats for round axles.....	14
	4.2 Welding of HD axle seats for round axles.....	15
	4.3 Welding of axle seats for square 120mm axles.....	16
	4.4 Welding of axle seats for square 150mm axles assembled from separate plates.....	17
	4.5 Welding of HD axle seats for square 150mm axles.....	18
5	Air springs.....	19
	5.1 Standard Ø300 & Ø350.....	19
	5.2 Special combo-stud & 4-studs.....	19
	5.3 General air spring clearance.....	20
	5.4 Load-pressure diagram standard configuration Ø300 air springs.....	21
	5.5 Load-pressure diagram standard configuration Ø350 air springs.....	21
6	Shock absorber overview.....	22
7	Alignment of system & axle	23
	7.1 Alignment of air suspension versus axle.....	23
	7.2 Alignment of trailing arm eye height.....	23
	7.3 Alignment of axles.....	24
	7.4 Adjusting the standard hanger bracket alignment.....	24
	7.5 Adjusting the hanger bracket alignment with excentric disc.....	25
	7.6 Adjusting the axle seat clamping alignment.....	25
8	Paint instruction.....	26
9	Axle lifts.....	27
	9.1 Axle lift versions.....	27
	9.2 General clearances two-sided axle lift.....	27
10	Torque settings MBS-HD Air suspension.....	28

Contents

11	Air suspension on axle assembly.....	29
12	Final air suspension assembly 1.....	35
13	Final air suspension assembly 2.....	40
14	Available axle clampings.....	46
	Axle clampings Ø127 / Ø146.....	46
	Axle clampings □120.....	51
	Axle clampings □150.....	54
15	Available air spring (offset) options.....	59
	Ø300 air springs.....	59
	Ø350 air springs.....	62
16	Rear mounted shock absorbers.....	72

General notes

The installation instructions in this manual are specific for the VDL Weweler MBS-HD air suspension and not valid for other systems. The used assembly jig(s) are examples that can assist with proper installation. The illustrated chassis and cross bracings are solely drawn as examples for installation as cross bracing and component dimensions depend upon the respective vehicle type and its field of application. The data is intended as a guideline for the trailer builders vehicle design.

The design of the vehicle chassis is always the responsibility of the trailer builder.

Further desired or required data for the VDL Weweler air suspensions such as additional dimensions, permitted centre of gravity heights, etc. can be found in the additional technical documents (f.e. the standard and/or application system drawings) which can be supplied upon request.

Welding remarks

The trailing arms, air bags and plastic shock absorber covers are to be protected against welding sparks and weld spatter when carrying out all welding work. The earth clamp must never be connected to the trailing arm or the axle hub.

No welding is allowed on the trailing arms!

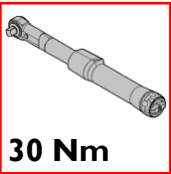
Warranty and liability

VDL Weweler B.V. warrants all in house manufactured products and all non VDL Weweler components needed to complete a VDL Weweler product, for a period as per listed in the “Warranty tables” in the “VDL Weweler General Defects Liability Statement Trailer” or otherwise agreed in writing.

The “VDL Weweler General Defects Liability Statement Trailer” can be downloaded from our website www.vdlweweler.nl.

Pictograms & symbols

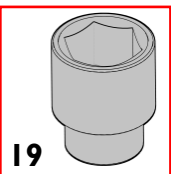
In this manual the following pictograms and symbols are used to illustrate specific instructions or warnings:



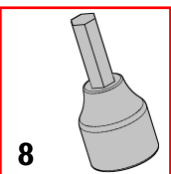
Use an appropriate calibrated torque wrench.
Tighten the fastener to the torque in Nm given in the left-hand corner.



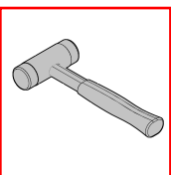
Use an appropriate calibrated torque wrench.
Tighten the fastener to the torque in Nm + the additional specified turn of the fastener in degrees given in the left-hand corner .



Use a socket wrench.
The value in the left-hand corner is the socket wrench size in mm.



Use a hex socket wrench.
The value in the left-hand corner is the hex socket wrench size in mm.



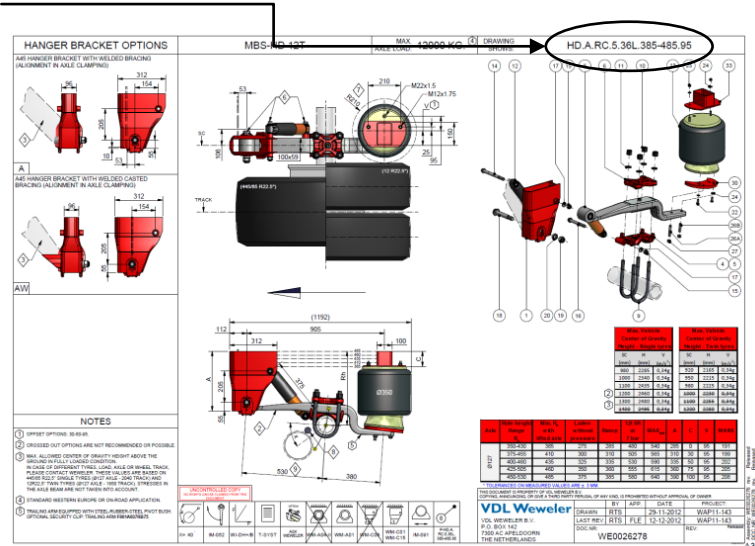
Use a rubber or plastic hammer.



CAUTION
Weight exceeds 25 kg.

I - Explanation MBS-HD Air Suspension system coding

The MBS-HD air suspension code refers to the available standard system drawings or customer specific application drawings. The code can be found at the righthand top on the drawing.



HD.A.RC.5C.36L.385.95

Air spring offset

Nominal ride height (minimum ride height with lifted axle)

Air spring

30	= EURO (Ø300)	36L	= E2ST2 (Ø350)
30C	= EURO-COMBO (Ø300)	36LT	= E2ST2 (Ø350 - 45°)
30L	= EURO-HYBRIDE (Ø300)	36LR	= E2ST2R (Ø350 REINFORCED PISTON)
36	= E1ST2 (Ø350)	36LS	= E2ST2S (Ø350 SWIVEL PISTON)
36R	= E1ST2R (Ø350 REINFORCED PISTON)	36L4	= E2 (Ø350 - 4 STUDS)
36S	= E1ST2S (Ø350 SWIVEL PISTON)	36M4	= F12 (Ø370 - 4 STUDS)
364	= E1 (Ø350 - 4 STUDS)	36ML	= F14 (Ø350)

Axle clamping

3	= Ø133	7A	= □150 - U-BOLT VERSION
4	= □120 BPW	7B	= □150 HD - U-BOLT VERSION
5	= Ø127	7C	= □150 HD
5C	= Ø127 HD	8	= Ø146
6	= □120	8C	= Ø146 HD
7	= □150	9	= NO CLAMPING

USE ADDITION "L" FOR EXTENDED U-BOLT PLATE

Trailing arm

H - Serie	= 100x48mm trailing arms
E & I - Serie	= 100x54mm trailing arms
R - Serie	= 100x59mm trailing arms
D - Serie	= 100x35mm + 100x35mm trailing arms
B & G - Serie	= 100x35mm + 100x45mm trailing arms
C - Serie	= 100x45mm + 100x45mm trailing arms

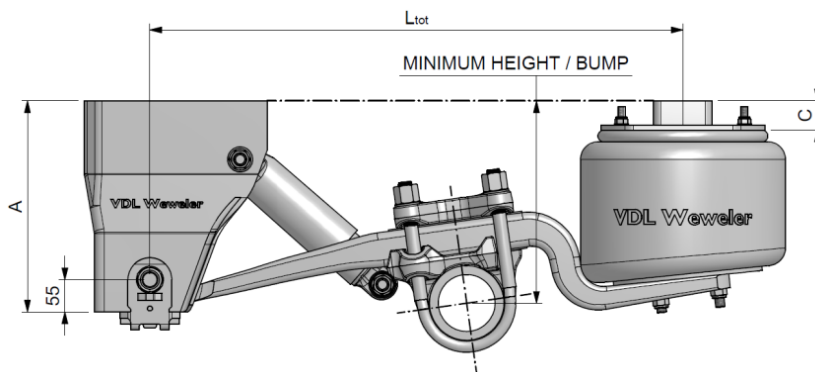
Hanger bracket

A	= UT001A36. / UT001A45. / UT001A88.
AM	= UT001A25.
C	= UT00C36. / UT001C45. / UT001C88.
CM	= UT001C25.
S	= TILT VERSION TYPE A & C (3° OR 5°)

USE ADDITION "B" FOR BOLT-ON BRACING
 USE ADDITION "W" FOR WELDED CASTED BRACING
 USE ADDITION "S" FOR DISC ALIGNMENT

2. Technical specifications / design information

MBS-HD air suspension system layout and overall system dimensions.



Minimum height & Bump:

Internal bump stops inside the air spring are used to limit the upward suspension stroke.

Bump

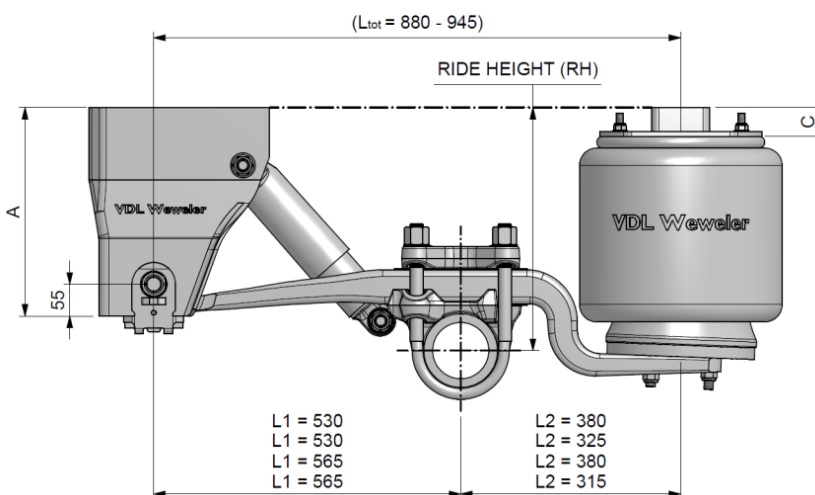
When the vehicle is empty without air the system rests on the bumpstop. This gives the system "Bump" dimension. The dimension bump also determines the lift height.

Minimum height (MH)

When the vehicle is fully laden without air the bump is compressed by a certain distance depending on the type of air spring.

This gives the system "Minimum Height" dimension (MH).

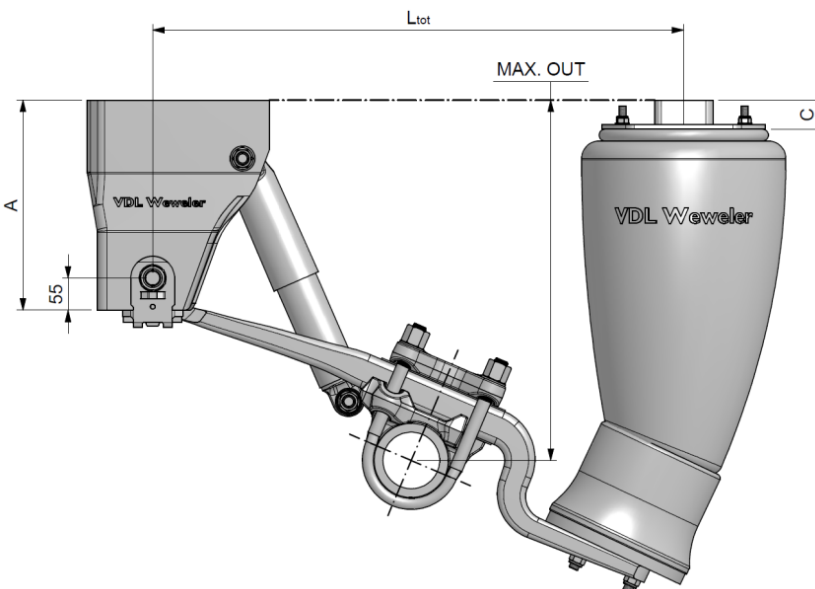
When an air spring failure occurs the internal bump stops enables the user to run (without air pressure) at very low speed for a short period of time to get to the nearest service station. To prevent further damage, always make sure that there is enough clearance for all moving parts.



Ride height (RH):

The ride height can be set with the levelling valve within a certain range. Check the specific system drawing for the possible settings.

If the vehicle is equipped with a raise/lower valve it is only allowed to use this valve for loading and unloading. Driving with the valve engaged may cause damage to the load, trailer, brakes and suspension system.



Max. out:

The VDL Weweler air suspension systems have been engineered so that the shock absorber acts as the outbound stroke limitation.

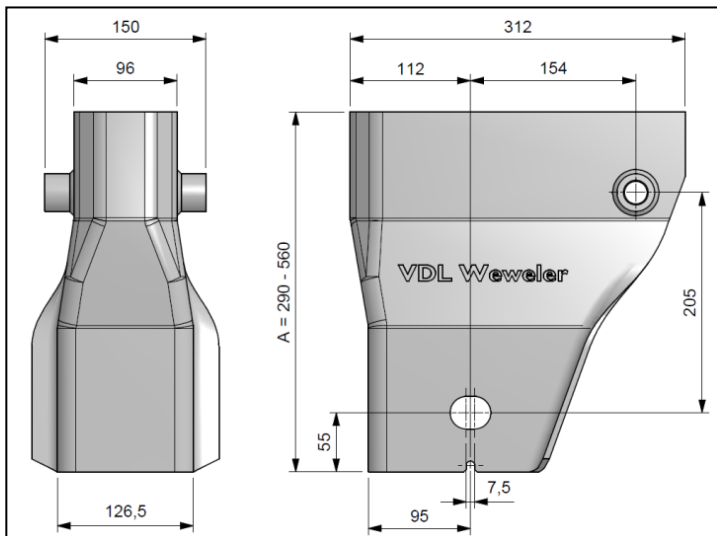
This obviates the need for check straps or other suspension stops.

The maximum shock absorber length and the air spring height at this maximum outward position are in relation to each other. Therefore the system configuration (hanger bracket height "A" and pedestal "C") may not be changed without the approval of VDL Weweler.

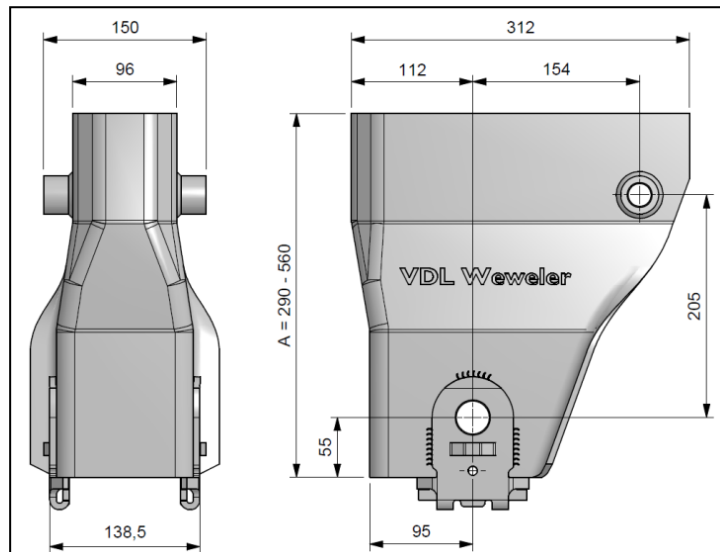
3. Hanger brackets & pedestals

3.1 Dimensions of hanger brackets & pedestal

3.1a Standard hanger brackets

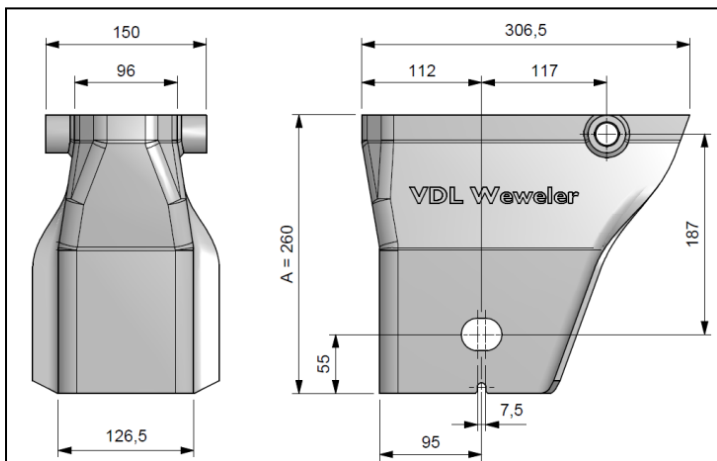


Hanger bracket (type "C") with system alignment option.
 Standard hanger brackets available in heights (dim. A) from 290mm up to 560mm.
 Separate wear/alignment plates are required.
 In combination with the bolt-on bracing (type "CB") or welded casted bracing (type "CW") allowed up to an axle load of 10t.

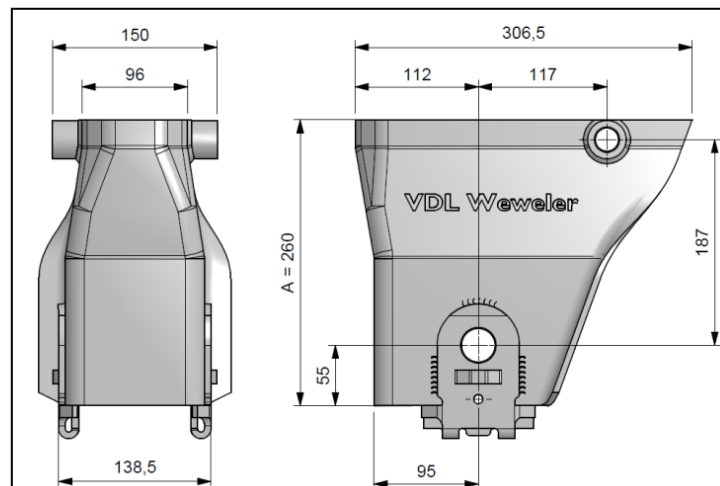


Hanger bracket (type "A") with welded fixed wear plates.
 Standard hanger brackets available in heights (dim. A) from 290mm up to 560mm.
 Welded fixed wear plates are required for systems with an axle load over 9t in combination with a conventional plate bracing or over 10t in combination with the bolt-on or welded casted bracing.

3.1b Special low hanger bracket



Hanger bracket (type "C") with system alignment option.
 This low hanger bracket is only available in a height (dim. A) of 260mm. and only suitable for chassis beams with a maximum width of 150mm.
 Separate wear/alignment plates are required.
 In combination with the bolt-on bracing (type "CB") or welded casted bracing (type "CW") allowed up to an axle load of 10t.

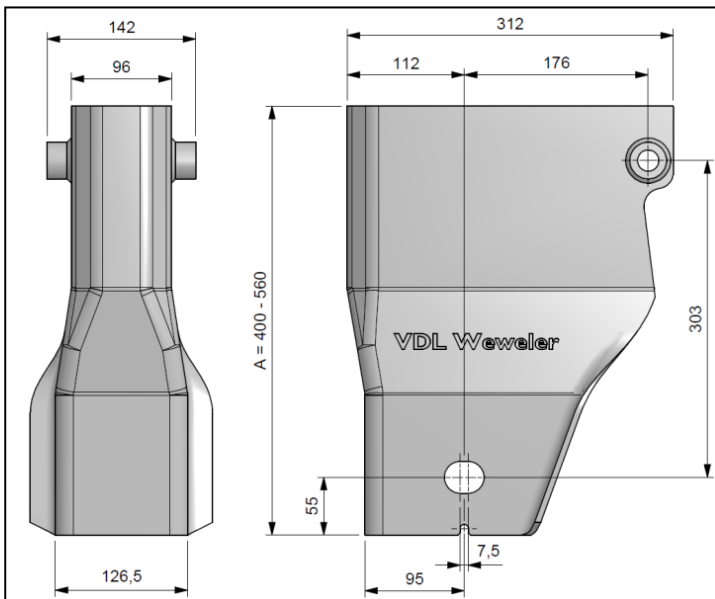


Hanger bracket (type "A") with welded fixed wear plates.
 This low hanger bracket is only available in a height (dim. A) of 260mm. and only suitable for chassis beams with a maximum width of 150mm.
 Welded fixed wear plates are required for systems with an axle load over 9t in combination with a conventional plate bracing or over 10t in combination with the bolt-on or welded casted bracing.

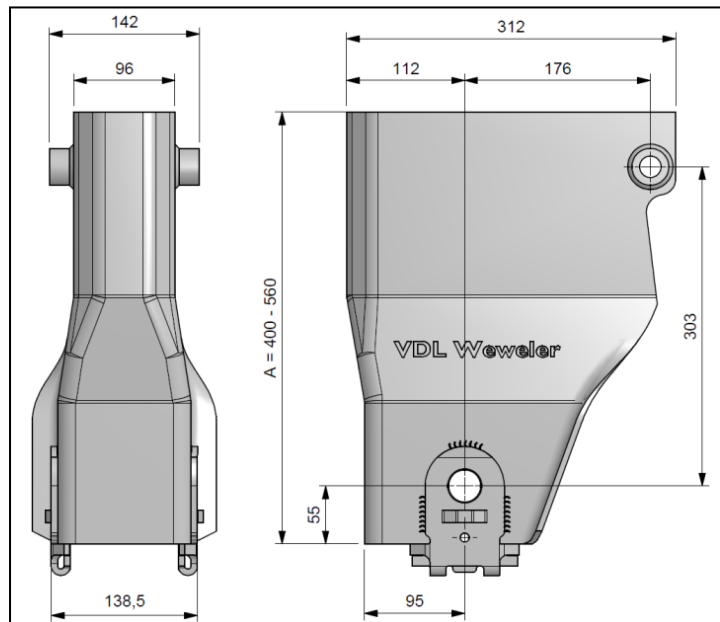
3. Hanger brackets & pedestals

3.1 Dimensions of hanger bracket & pedestal

3.1c Special hanger brackets (center mounted shock absorber)

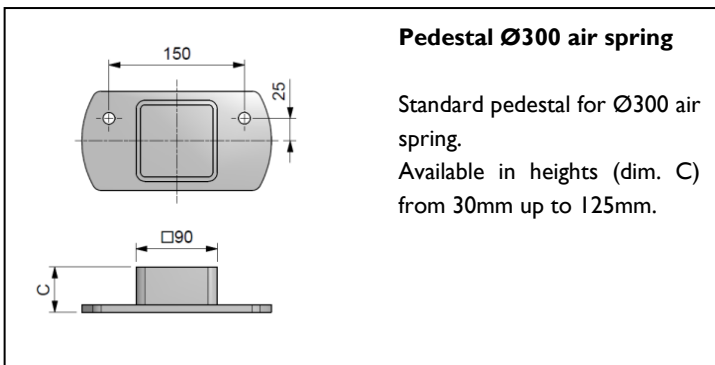


Special hanger bracket (type "CM") with system alignment option for center mounted shock absorber.
 Standard hanger brackets available in heights (dim. A) from 400mm up to 560mm.
 Separate wear/alignment plates are required.
 In combination with the bolt-on bracing (type "CMB") or welded casted bracing (type "CMW") allowed up to an axle load of 10t.



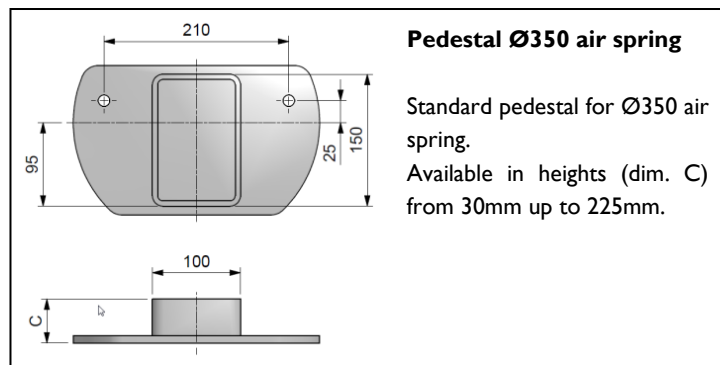
Special hanger bracket (type "AM") with welded fixed wear plates for center mounted shock absorber.
 Standard hanger brackets available in heights (dim. A) from 400mm up to 560mm.
 Welded fixed wear plates are required for systems with an axle load over 9t in combination with a conventional plate bracing or over 10t in combination with the bolt-on or welded casted bracing.

3.1d Pedestals



Pedestal Ø300 air spring

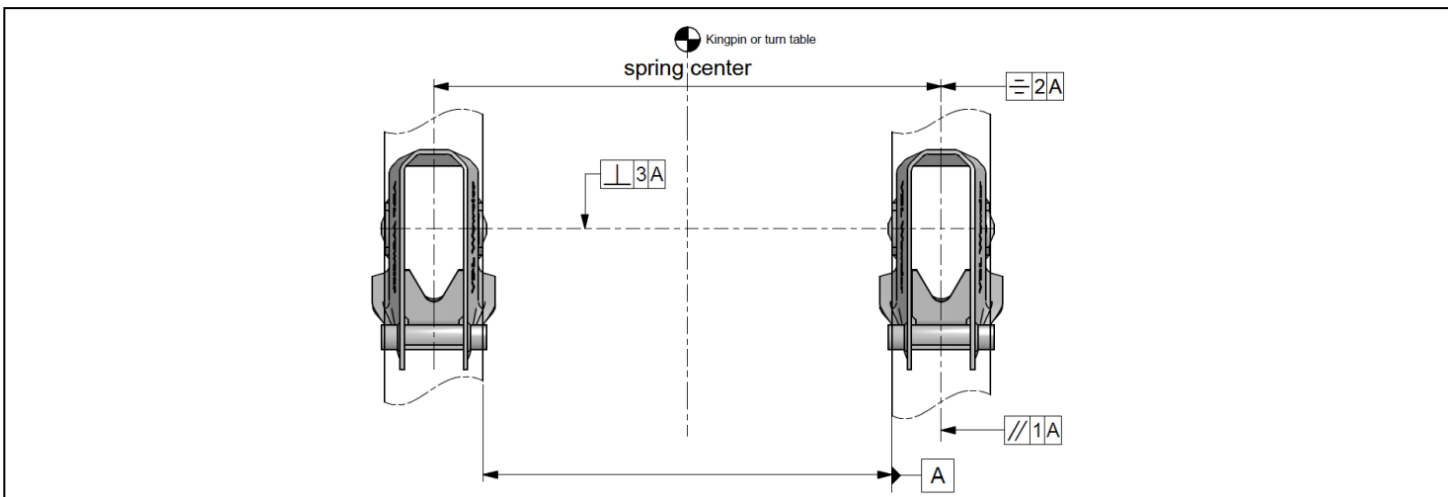
Standard pedestal for Ø300 air spring.
 Available in heights (dim. C) from 30mm up to 125mm.



Pedestal Ø350 air spring

Standard pedestal for Ø350 air spring.
 Available in heights (dim. C) from 30mm up to 225mm.

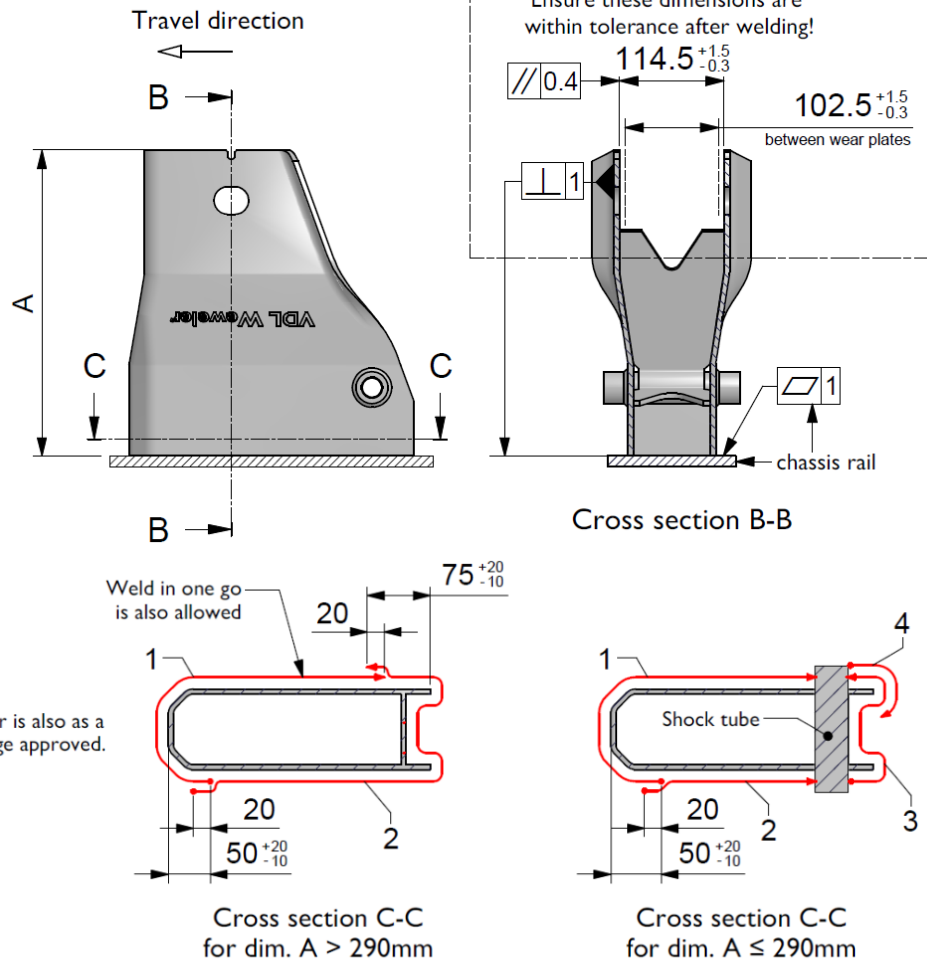
3.2 Alignment of hanger bracket



3. Hanger brackets & pedestals

3.3 Welding of hanger bracket

Weld thickness: S8a5 min. fillet weld (ISO 2553)



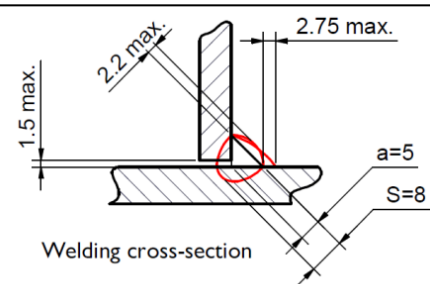
Welding order:

— Tack weld ● Begin → End

Material chassis = CEV ≤ 0.47%

$$CEV = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Ni+Cu)/15)$$

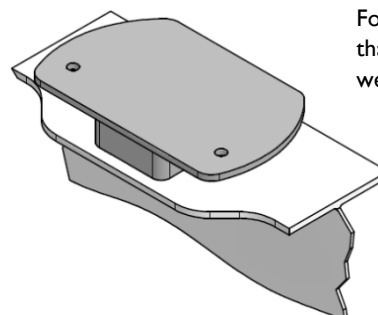
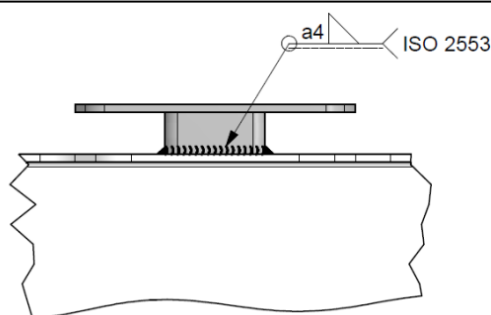
Item	Specifications
Welding wire	Acc. DIN EN ISO 14341. Material-Nr 1.5125, Ø1.2 mm
Supply	1-wire technique
Gas mixture	92-8 Argon / O ₂ or Sagox2 84-13-3 Argon / CO ₂ / O ₂ or Sagox10 90-10 Argon / CO ₂
Welding parameters	Current: 240 - 340 A Puls voltage: 26 - 40 V



Check up:

1. Demands and qualification according DIN EN ISO 15614-1.
2. Judgement of craters according DIN EN ISO 5817 acc. class C.
Except for the numbers: 2011, 2012, 2016, 2017, 5012, 5213. Those should be judged according DIN EN ISO 5817 acc. **class B**.

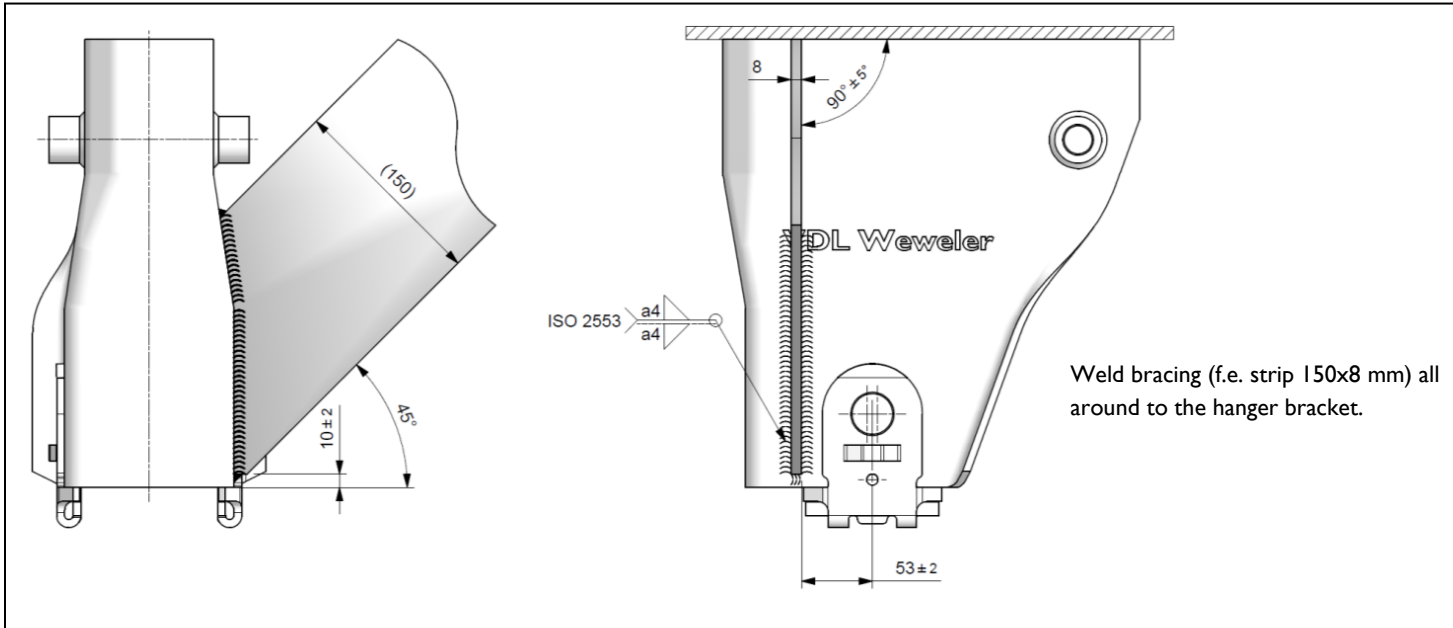
3.4 Welding of pedestal



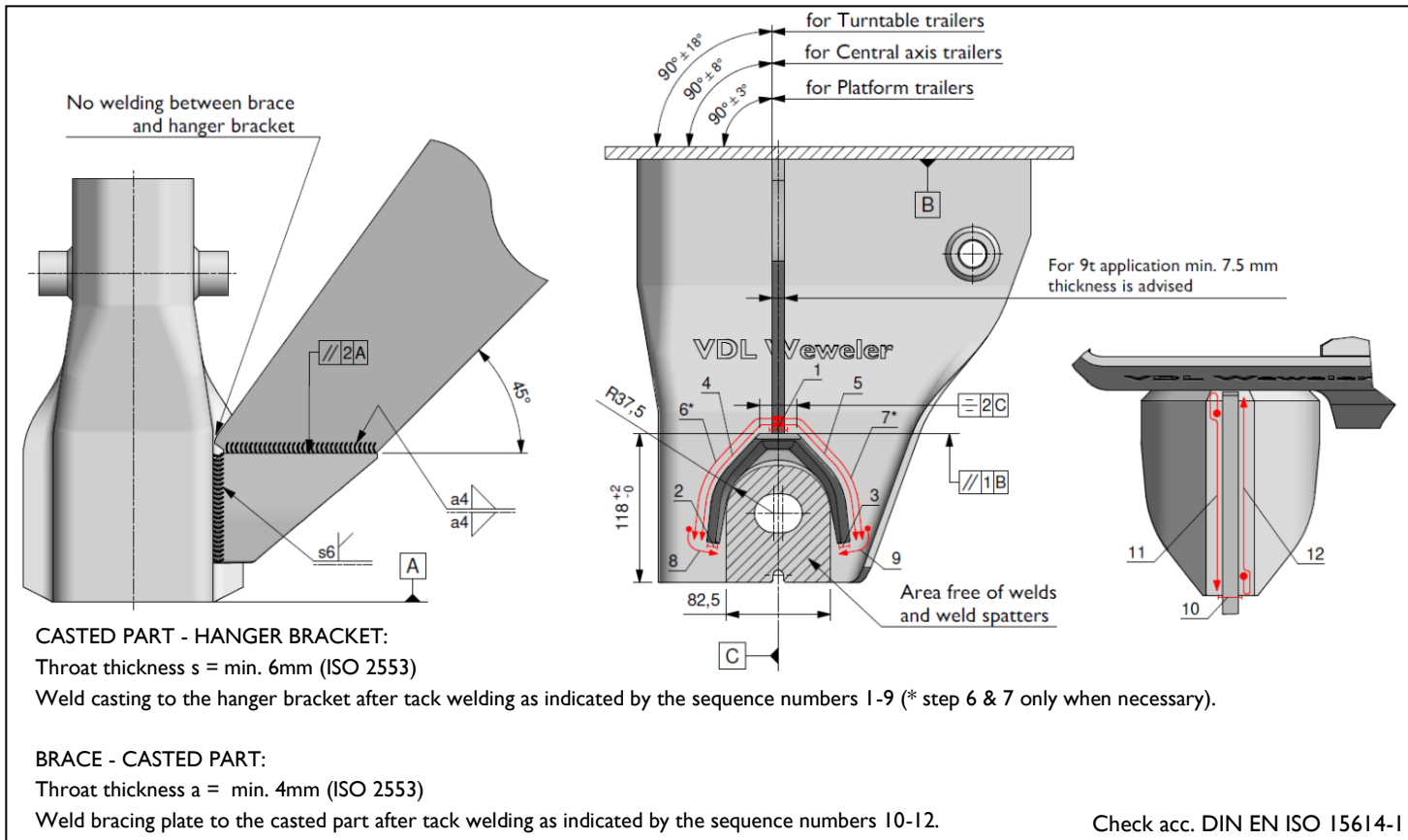
For pedestal heights less than 40mm it is sufficient to weld two opposite sides.

3. Hanger brackets & pedestals

3.5 Welding of plate for hanger bracket bracing



3.6 Welding of casting for hanger bracket bracing



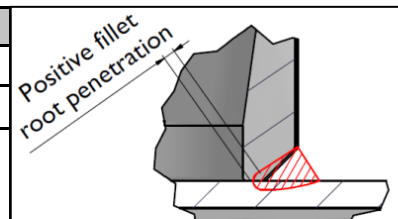
Welding order:

→ Tack weld ● Begin → End

Material brace = CEV ≤ 0.47%

$$CEV = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Ni+Cu)/15)$$

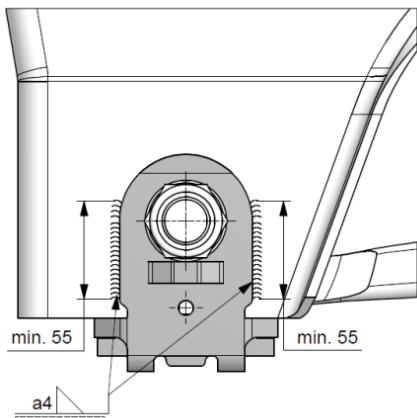
Item	Specifications
Welding wire	Acc. DIN EN ISO 14341. Material-Nr 1.5125, Ø1.2 mm
Supply	I-wire technique
Gas mixture	92-8 Argon / O ₂ or 84-13-3 Argon / CO ₂ / O ₂ or 90-10 Argon / CO ₂
Welding parameters	Current: 240 - 340 A Puls voltage: 26 - 40 V



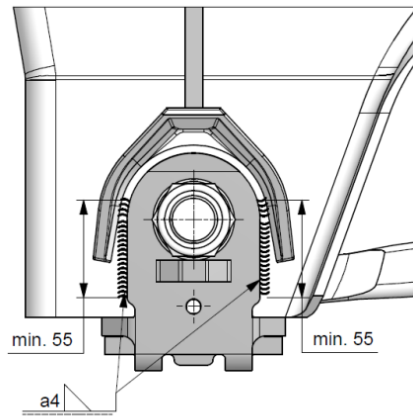
- Ensure good penetration but avoid undercutting at the edges of the weld.
- Tack welds or craters should be fully filled.

3. Hanger brackets & pedestals

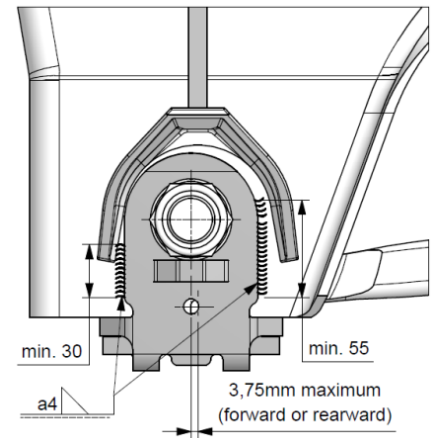
3.7 Welding of wear plates after alignment



Weld wear plates as shown after alignment where the casted brace has not been welded in place yet or is on the side of the hanger bracket that has no brace.
A full weld around the wear plate is also allowed.



Weld wear plates as shown after alignment where the casted brace has already been welded in place.



Welding as shown is only advised in cases where the alignment is done with the casted bracing in place and the wear plate is at its maximum alignment offset.

- NOTE:
- Both wear plates on each side of the hanger bracket must be welded.
 - Paint welded area afterwards in order to protect from oxidation.

4. Axle seat welding

4.1 Welding of standard axle seats for round axles

Before welding the temperature of the axle seat and axle beam has to be $> 10^{\circ}\text{C}$.

These instructions are valid for both underslung and overslung applications.

Both seats have to be positioned parallel horizontally and must be at the same level longitudinally to the axle beam. Max. variation in angle between seats = $0,3^{\circ}$

DIRECTION OF TRAVEL

(2x)

#

AXLE SEAT LH

AXLE SEAT RH

$\leq 0,3^{\circ}$

Ensure the axle beam contacts the four support surfaces of the axle seat #.

Ensure there is sufficient clamping force between the axle beam and the axle seat during tack welding (if possible use the weight of the axle beam on top of the axle seat) to avoid clearance arising between the axle beam and support surfaces of the axle seat. Do not use the U-bolts to clamp the seat in position as this may deform the axle seat or damage the U-bolts.

Note: Only weld the 85 mm. length on the front and back of the seat, as shown in the drawing.

Weld height a=8 mm. (ISO 2553)

Weld order (for MIG/MAG welds):

Building up of the weld in three layers as detailed below and shown in the drawing on the left.

Important: Weld first & second layer on one wheel end side (left or right), then weld the other wheel end side. And then go back and apply the third layer (as then the first two layers are cooled down enough).

1st layer:

- 1-2: Start weld from 1 and return through 180 degrees on initial weld.
- 2-3: Start "Stitching" welds.

2nd layer:

- 4-5: Start "Waving" welds.
- 5-6: Weld over to infill crater.

3rd layer:

- 7-8: Start weld from 7 on top of the weld and return through 180 degrees on initial weld.
- 8-9: Start "Seam" welds.
- 9-10: Weld over to infill crater.

General Welding Information

- Important: the earth connector should be attached to the axle beam in such a way that no welding current can be transferred to the bearing sets.
- Tack welds or craters should be fully filled.
- Never test the arc on the axle beam itself.

Rotate axle beam to obtain a PA/PB welding position (inverted welding)

Positive fillet root penetration

First layer

Second layer

Third layer

TOP

min. 50° min. 50°

Max. permitted weld area.

No welding permitted (also no tack weld)

Positive fillet root penetration

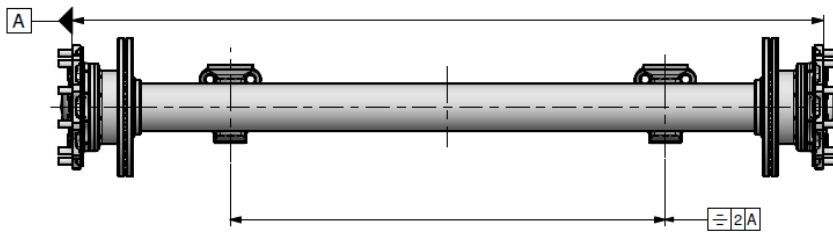
First layer

Second layer

Third layer

4. Axle seat welding

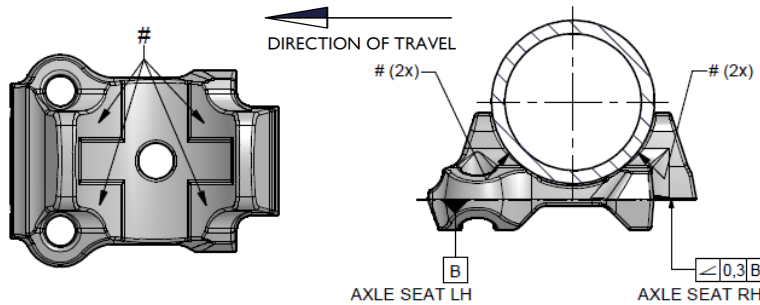
4.2 Welding of HD axle seats for round axes



Before welding the temperature of the axle seat and axle beam has to be $> 10^{\circ}\text{C}$.

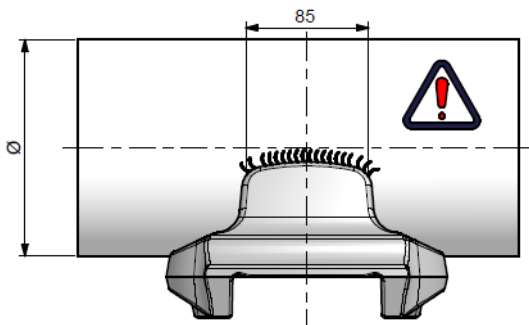
These instructions are valid for both underslung and overslung applications.

Both seats have to be positioned parallel horizontally and must be at the same level longitudinally to the axle beam. Max. variation in angle between seats = $0,3^{\circ}$



Ensure the axle beam contacts the four support surfaces of the axle seat #.

Ensure there is sufficient clamping force between the axle beam and the axle seat during tack welding (if possible use the weight of the axle beam on top of the axle seat) to avoid clearance arising between the axle beam and support surfaces of the axle seat. Do not use the U-bolts to clamp the seat in position as this may deform the axle seat or damage the U-bolts.



Note: Only weld the 85 mm. length on the front and back of the seat, as shown in the drawing.

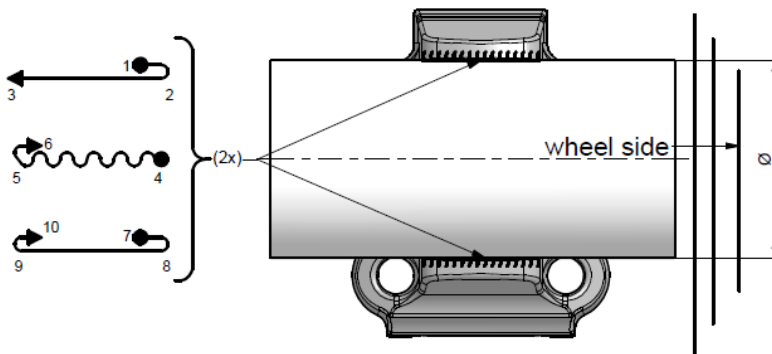
Weld height $a=8$ mm. (ISO 2553)

Weld order (for MIG/MAG welds):

Building up of the weld in three layers as detailed below and shown in the drawing on the left.



Important: Weld first & second layer on one wheel end side (left or right), then weld the other wheel end side. And then go back and apply the third layer (as then the first two layers are cooled down enough).



1st layer:

- 1-2: Start weld from 1 and return through 180 degrees on initial weld.
- 2-3: Start "Stitching" welds.

2nd layer:

- 4-5: Start "Waving" welds.
- 5-6: Weld over to infill crater.

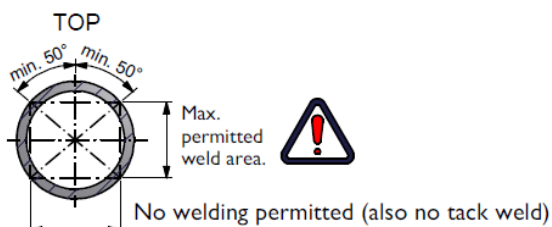
3rd layer:

- 7-8: Start weld from 7 on top of the weld and return through 180 degrees on initial weld.
- 8-9: Start "Seam" welds.
- 9-10: Weld over to infill crater

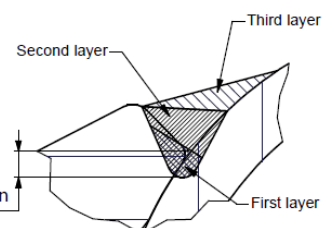
General Welding Information

- Important: the earth connector should be attached to the axle beam in such a way that no welding current can be transferred to the bearing sets.
- Tack welds or craters should be fully filled.
- Never test the arc on the axle beam itself.

Rotate axle beam to obtain a PA/PB welding position (inverted welding)

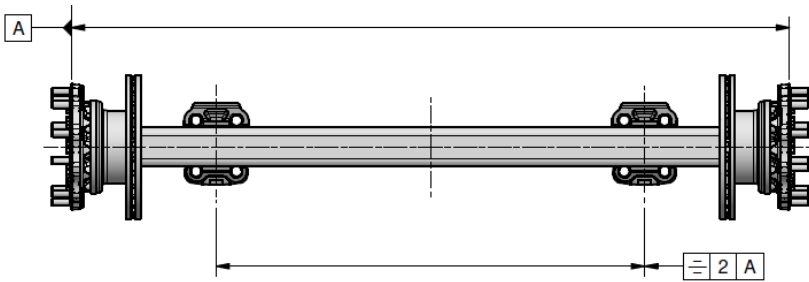


Positive fillet root penetration



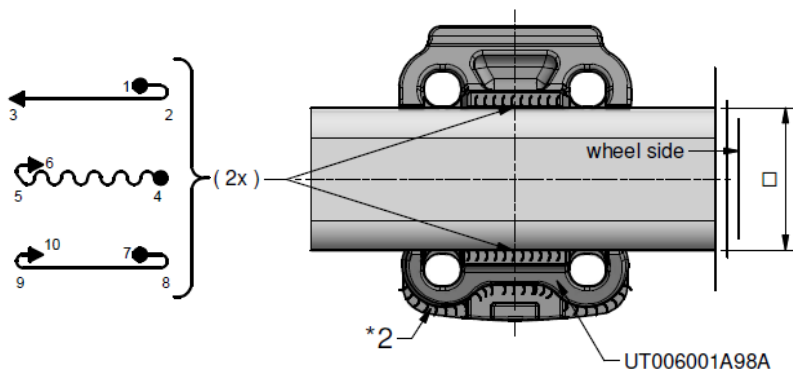
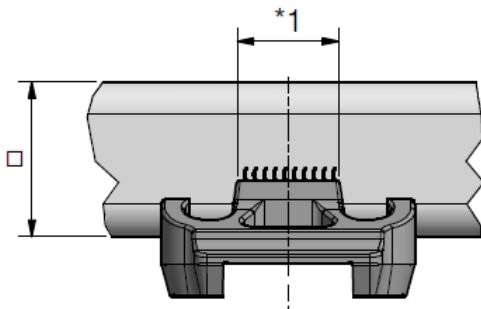
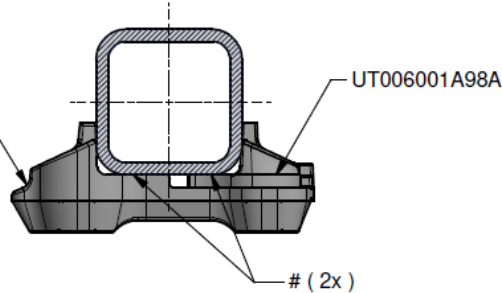
4. Axle seat welding

4.3 Welding of axle seats for square 120mm axles



DIRECTION OF TRAVEL

UT006001A95A
UT006001L95A
UT006001R95A



General Welding Information

- Important: the earth connector should be attached to the axle beam in such a way that no welding current can be transferred to the bearing sets.
- Tack welds or craters should be fully filled.
- Never test the arc on the axle beam itself.

Before welding the temperature of the axle seat has to be $> 10^{\circ}\text{C}$ and follow the requirements of the axle manufacturer for the axle beam.

These instructions are valid for both underslung and overslung applications.

Both axle seats have to be positioned parallel horizontally and must be at the same level longitudinally to the axle beam. Max. variation in angle between seats = $0,3^{\circ}$. Ensure the axle beam contacts the base of the axle seat parts (#). Place the slider part UT006001A98A firmly against the axle beam.

Ensure there is sufficient clamping force between the axle beam and the axle seat during tack welding (if possible use the weight of the axle beam on top of the axle seat) to avoid clearance arising between the axle beam and support surfaces of the axle seat. Do not use the clamping (U-)bolts to clamp the seat in position as this may deform the axle seat or damage the (U-)bolts.

Connect *1 with two tack welds to the axle beam and *2 slider part UT006001A98A to UT006001A95A (or the left & righthand version of the axle seat). Subsequently weld according below procedure.

Weld *1: height a=6-8 mm. (ISO 2553)

Weld order (for MIG/MAG welds):

Building up of the weld *1 in three layers as detailed below and shown in the drawing on the left. **Important:** Weld first & second layer on one wheel end side (left or right), then weld the other wheel end side. And then go back and apply the third layer (as then the first two layers are cooled down enough).

1st layer:

- 1-2: Start weld from 1 and return through 180 degrees on initial weld.
- 2-3: Start "Stitching" welds.

2nd layer:

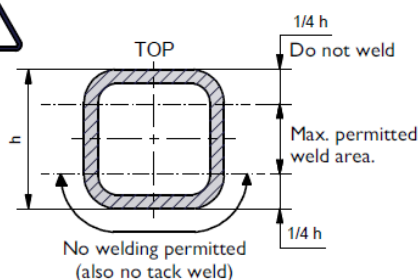
- 4-5: Start "Waving" welds.
- 5-6: Weld over to infill crater.

3rd layer:

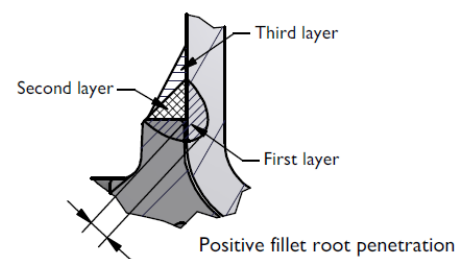
- 7-8: Start weld from 7 on top of the weld and return through 180 degrees on initial weld.
- 8-9: Start "Seam" welds.
- 9-10: Weld over to infill crater.

Weld *2: height a=5mm. (ISO 2553)

Weld between UT006001A95 and UT006001A98A.



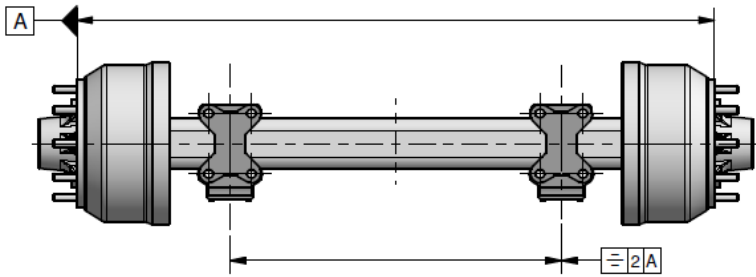
Rotate axle beam to obtain a PA/PB welding position. (inverted welding)



Ensure good penetration but avoid undercutting at the edges of the weld.

4. Axle seat welding

4.4 Welding of axle seats for square 150mm axles assembled from separate plates



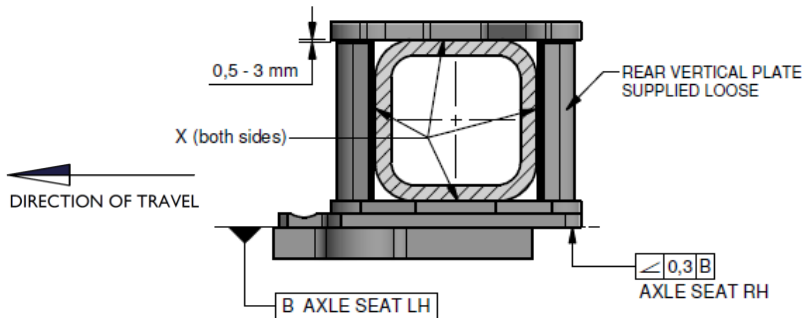
Before welding the temperature of the axle seat has to be $> 10^{\circ}\text{C}$ and follow the requirements of the axle manufacturer for the axle beam.

These instructions are valid for both underslung and overslung applications with front and rear mounted shock absorbers.

Bottom and top axle seats have to be positioned parallel horizontally and must be at the same level longitudinally to the axle beam. Max. variation in angle between seats = $0,3^{\circ}$

Always ensure that the axle beam is completely enclosed by the axle seat, top plate and the vertical plates. One plate is supplied loose which must be placed against the axle on the rear side. (contact X in 4 places).

The vertical plates may require shortening if they rise above the axle beam.



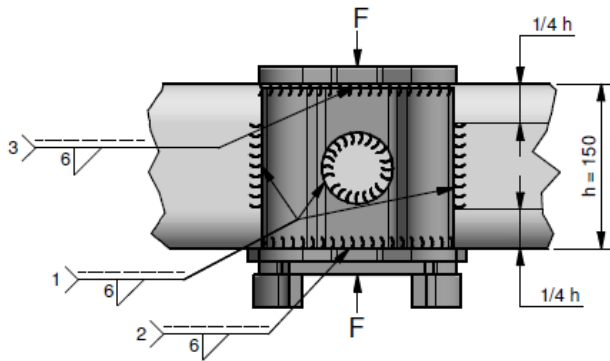
Ensure there is sufficient clamping force between the axle beam and the axle seat and plates during tack welding to avoid clearance arising between the axle beam and support/contact surfaces of the axle seat and plates. Do not use the clamping (U-)bolts to clamp the seat in position as this may deform the axle seat or damage the (U-)bolts.

First tack weld in the center hole of the vertical plates.

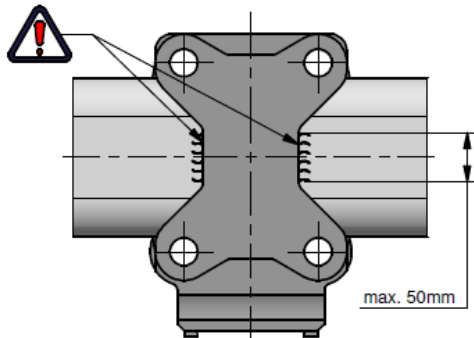
Weld height $a=6$ mm. (ISO 2553)

Weld the complete axle seat plate assembly on the front and back as shown on the left.

(Weld nr. 2 is only valid for the back side with the loose supplied vertical plate).



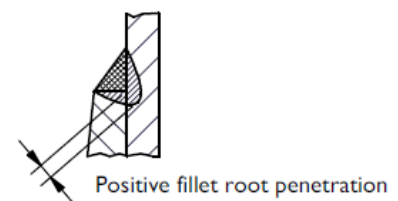
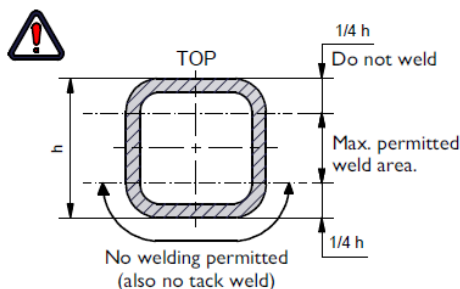
Finally weld the top plate on the top side of the axle as indicated. These welds are only permitted on the underslung configurations!



General Welding Information

- Important: the earth connector should be attached to the axle beam in such a way that no welding current can be transferred to the bearing sets.
- Tack welds or craters should be fully filled.
- Never test the arc on the axle beam itself.

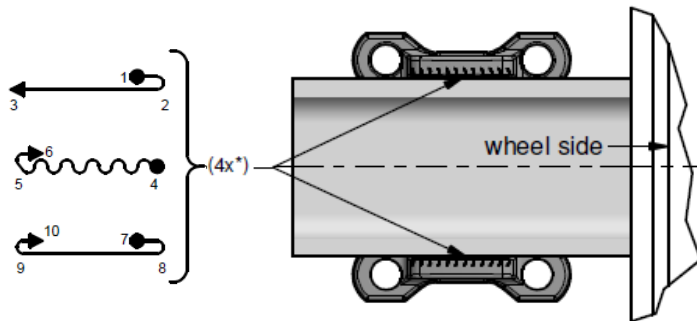
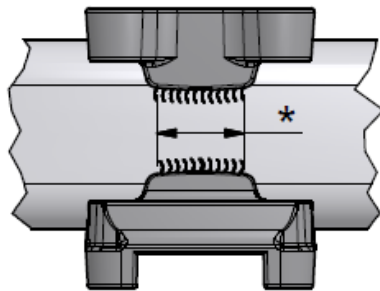
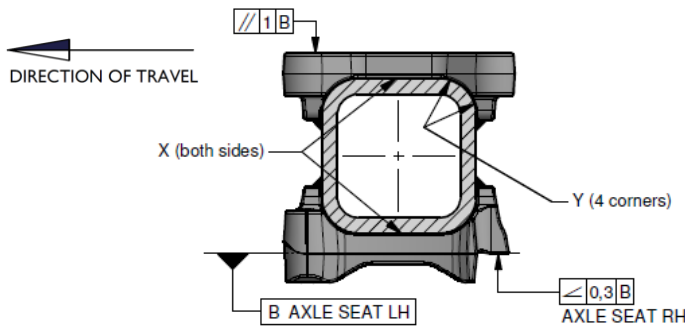
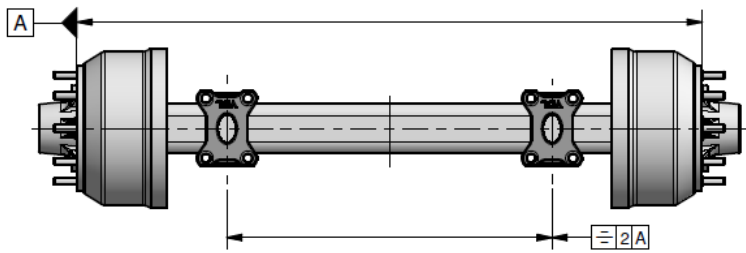
Rotate axle beam to obtain a PA/PB welding position. (inverted welding)



Ensure good penetration but avoid undercutting at the edges of the weld.

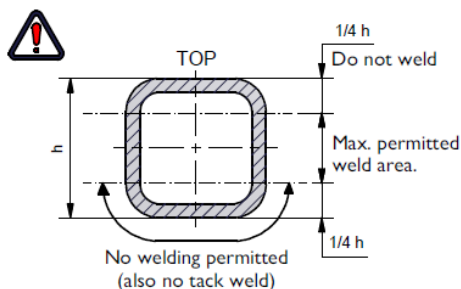
4. Axle seat welding

4.5 Welding of HD axle seats for square 150mm axles



General Welding Information

- Important: the earth connector should be attached to the axle beam in such a way that no welding current can be transferred to the bearing sets.
- Tack welds or craters should be fully filled.
- Never test the arc on the axle beam itself.



Before welding the temperature of the axle seat has to be $> 10^{\circ}\text{C}$ and follow the requirements of the axle manufacturer for the axle beam.

These instructions are valid for both underslung and overslung applications.

Bottom and top axle seats have to be positioned parallel horizontally and must be at the same level longitudinally to the axle beam. Max. variation in angle between seats = $0,3^{\circ}$

The axle beam must contact the base of the bottom and top axle seat (X) **OR** on two points in the radius of the axle seat on all 4 corners (Y).

Ensure there is sufficient clamping force between the axle beam and the axle seat during tack welding (if possible use the weight of the axle beam on top of the axle seat) to avoid clearance arising between the axle beam and support surfaces of the axle seat. Do not use the clamping (U-)bolts to clamp the seat in position as this may deform the axle seat or damage the (U-)bolts.

Weld height $a=8$ mm. (ISO 2553)

Weld order (for MIG/MAG welds):

Building up of the weld * in three layers as detailed below and shown in the drawing on the left.

Important: Weld first & second layer on one wheel end side (left or right), then weld the other wheel end side. And then go back and apply the third layer (as then the first two layers are cooled down enough).

1st layer:

- 1-2: Start weld from 1 and return through 180 degrees on initial weld.
- 2-3: Start "Stitching" welds.

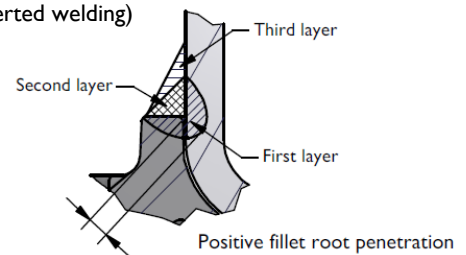
2nd layer:

- 4-5: Start "Waving" welds.
- 5-6: Weld over to infill crater.

3rd layer:

- 7-8: Start weld from 7 on top of the weld and return through 180 degrees on initial weld.
- 8-9: Start "Seam" welds.
- 9-10: Weld over to infill crater.

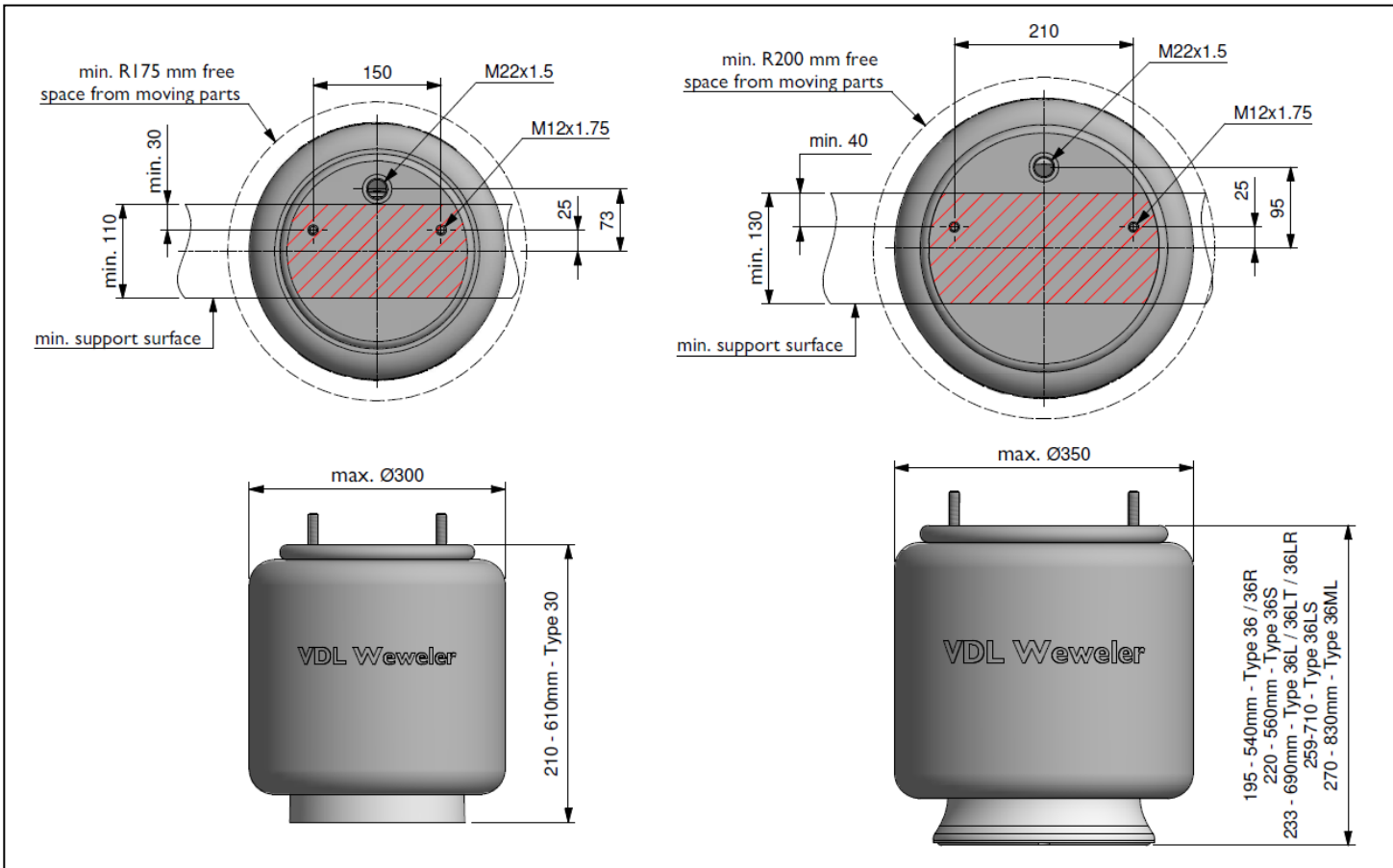
Rotate axle beam to obtain a PA/PB welding position. (inverted welding)



Ensure good penetration but avoid undercutting at the edges of the weld.

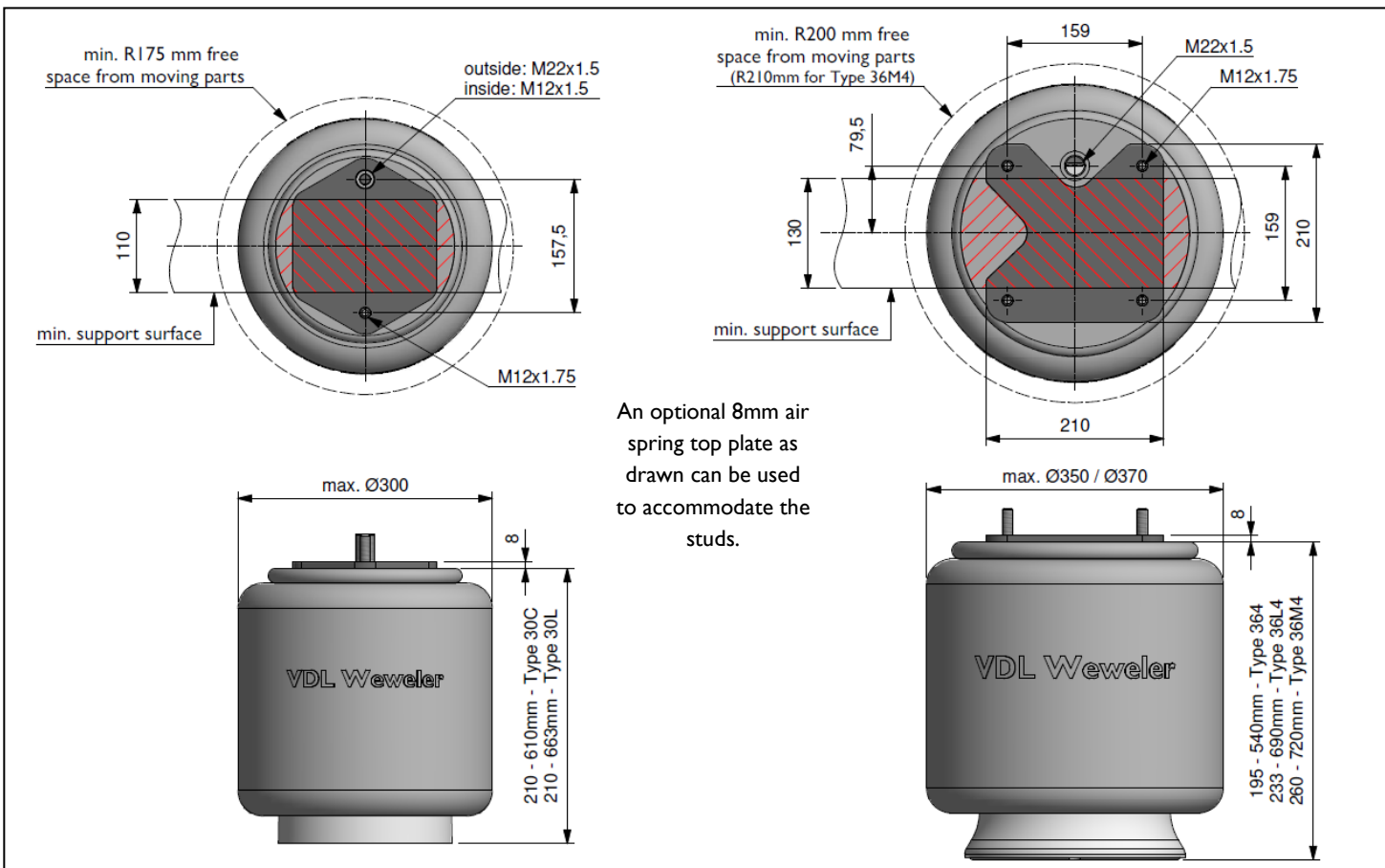
5. Air springs

5.1 Standard Ø300 & Ø350



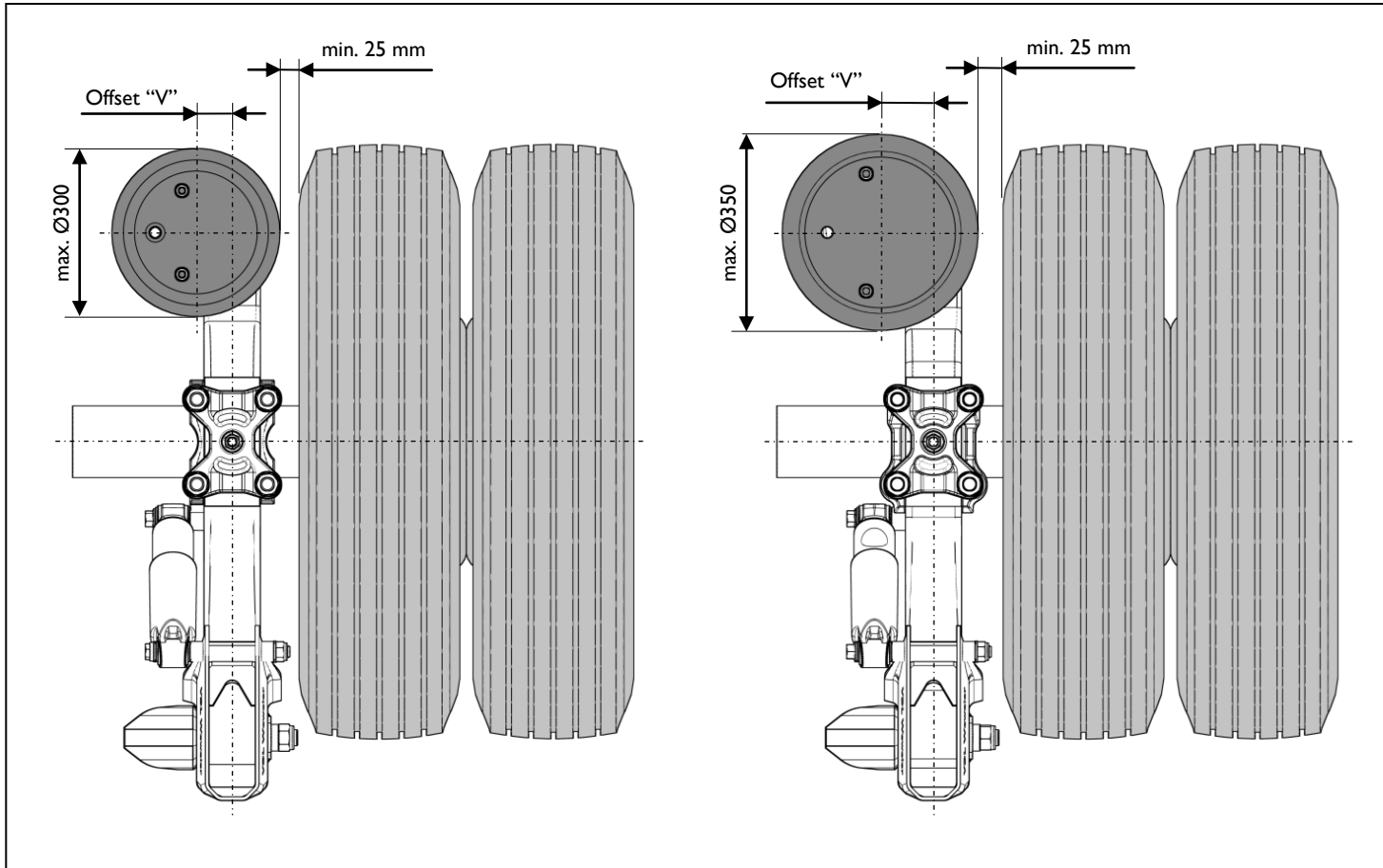
If the minimum support surface is less than indicated an additional support plate has to be added.

5.2 Special combo-stud & 4 studs



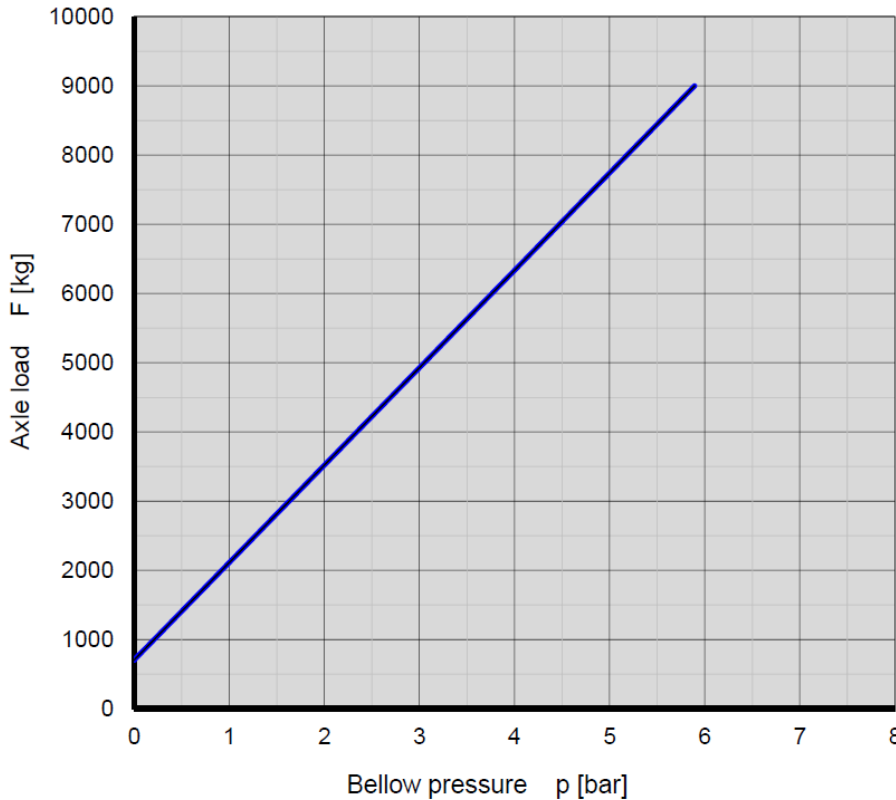
5. Air springs

5.3 General air spring clearance

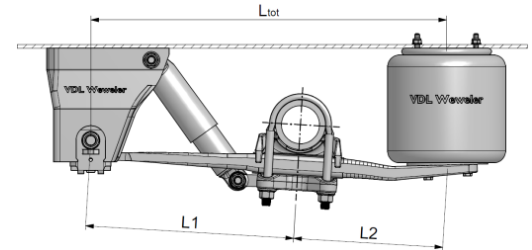


5. Air springs

5.4 Load-pressure diagram Ø300 air springs - standard system geometry



Assumed unsprung mass: 700 kg
 Maximum axle load: 9 t
 Reference numbers: US07364.
 US06288.
 US07074.

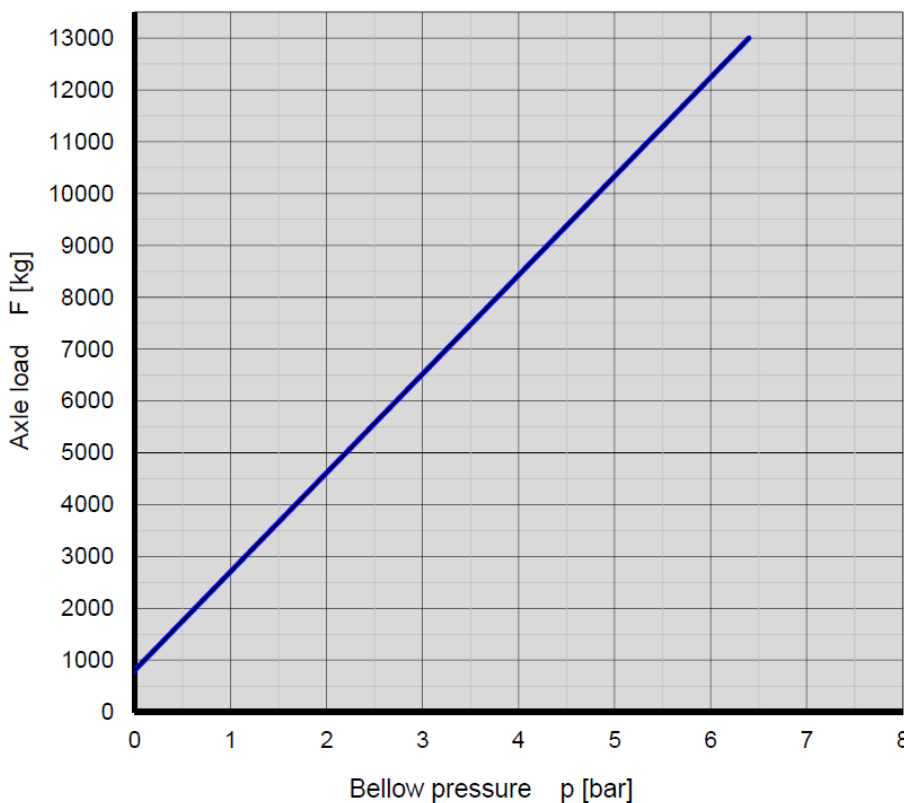


$$p = \frac{\text{axle load} - \text{unsprung mass}}{\text{geometry and air spring factor}} = \frac{F - 700}{1408}$$

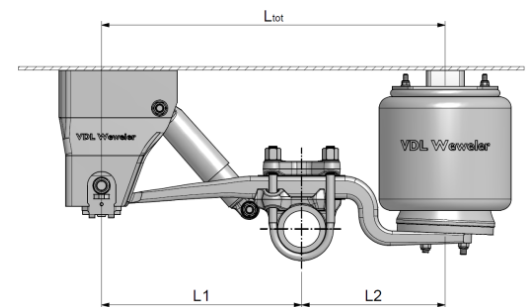
Ltot = 910mm
 L1 = 530 ± 10 mm
 L2 = 380 ± 10 mm

This diagram is theoretical.
 No rights can be claimed.

5.5 Load-pressure diagram Ø350 air springs - standard system geometry



Assumed unsprung mass: 800 kg
 Maximum axle load: 13 t
 Reference numbers: US04028.
 US04030.
 US07345.1
 US07337.
 US04428.
 US04437.



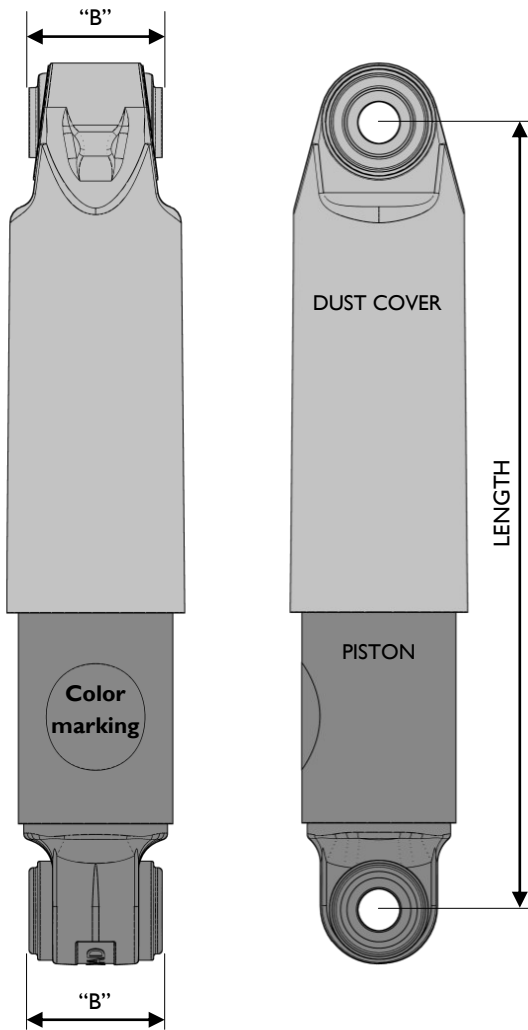
$$p = \frac{\text{axle load} - \text{unsprung mass}}{\text{geometry and air spring factor}} = \frac{F - 800}{1906}$$

Ltot = 910mm
 L1 = 530 ± 10 mm
 L2 = 380 ± 10 mm

This diagram is theoretical.
 No rights can be claimed.

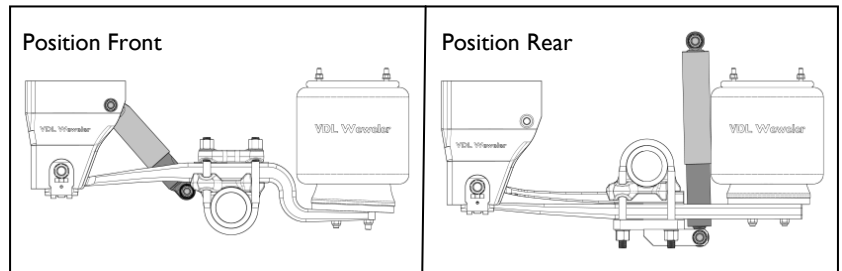
In case of different system geometry, unsprung mass or air spring type please contact VDL Weweler for the correct diagram.

6. Shock absorber overview

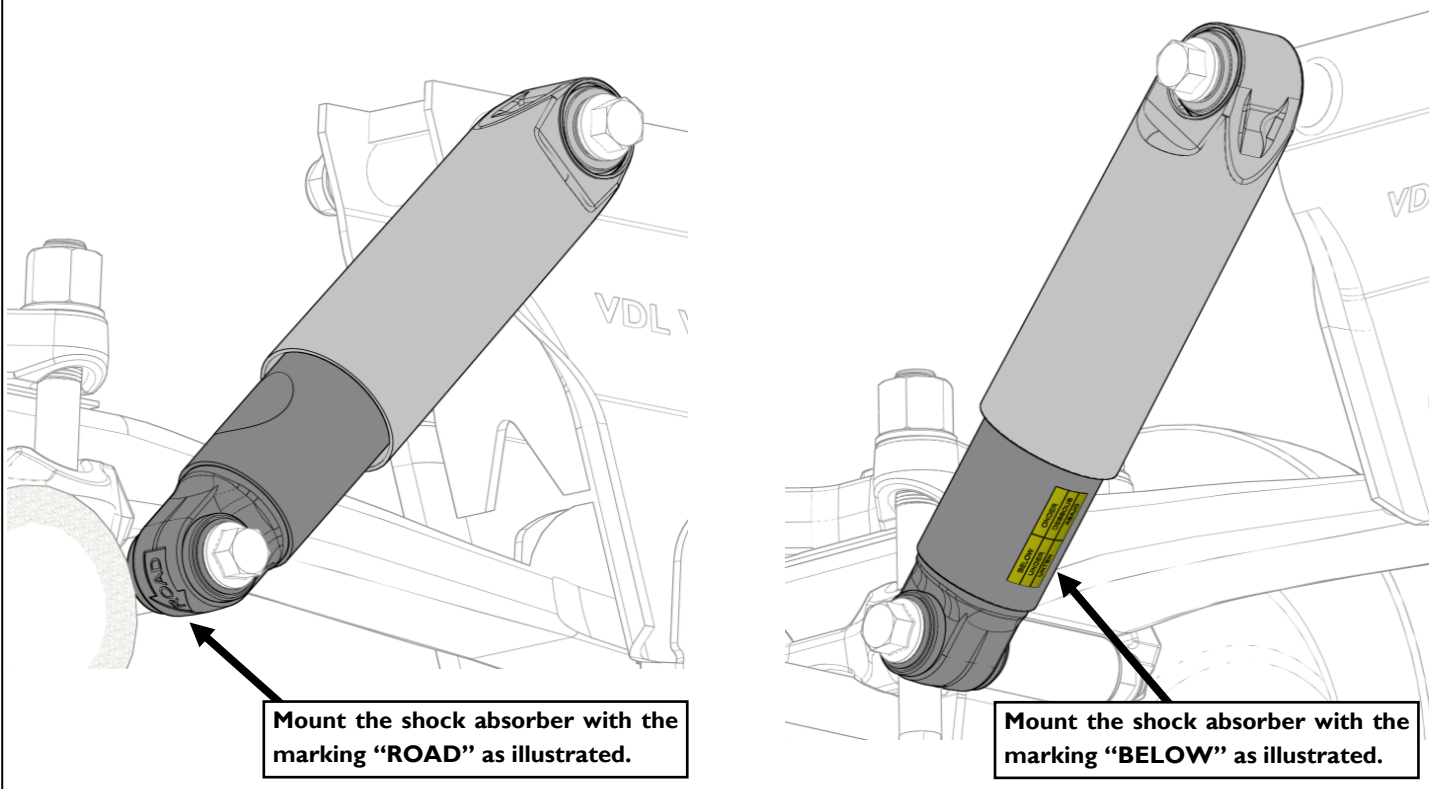


For the MBS-HD air suspension range are several standard shock absorbers available. These can be identified based on the type number and color. The plastic dust cover are in all cases black. The color is applied on the complete bottom piston part of the shock absorber or by means of a colored sticker on the shock absorber.

Type	Color	Min. length	Max. length	Mounting	Width "B"	Position
2643W	Black	294 mm	429 mm	M20	62 mm	Front
2640W	Orange	305 mm	453 mm	M20	62 mm	Front
2637W	Yellow	321 mm	479 mm	M20	62 mm	Front
2267W	Grey	341 mm	519 mm	M20	62 mm	Front
2036W	Red	296 mm	429 mm	M20	62 mm	Front
2687W	Blue	274 mm	387 mm	M20	62 mm	Front
991 ISPI	Black	430 mm	697 mm	M24	55 mm	Rear
2024SP3	Black	474 mm	791 mm	M24	55 mm	Rear

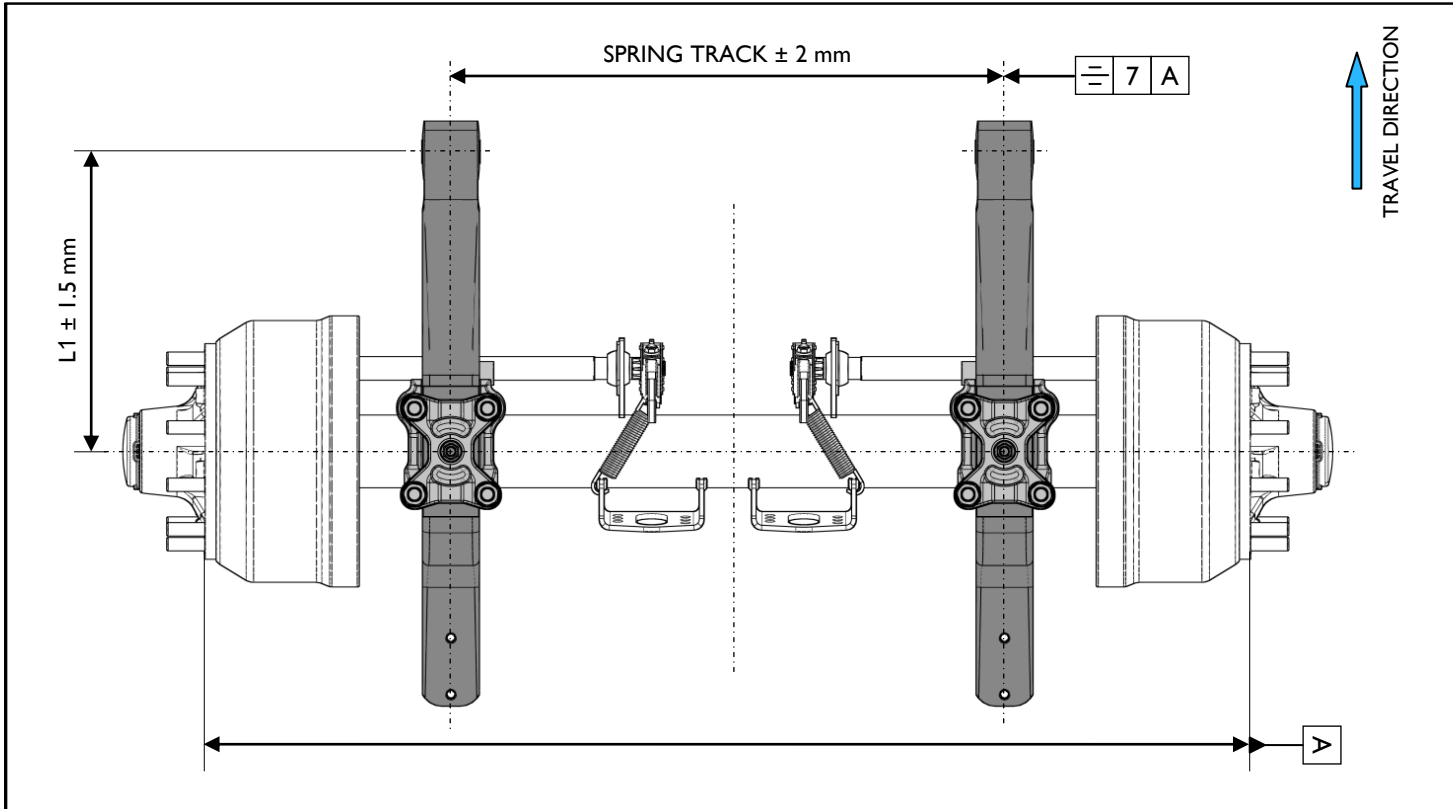


Follow the below instructions (if present on the shock absorber) when mounting the shock absorbers.

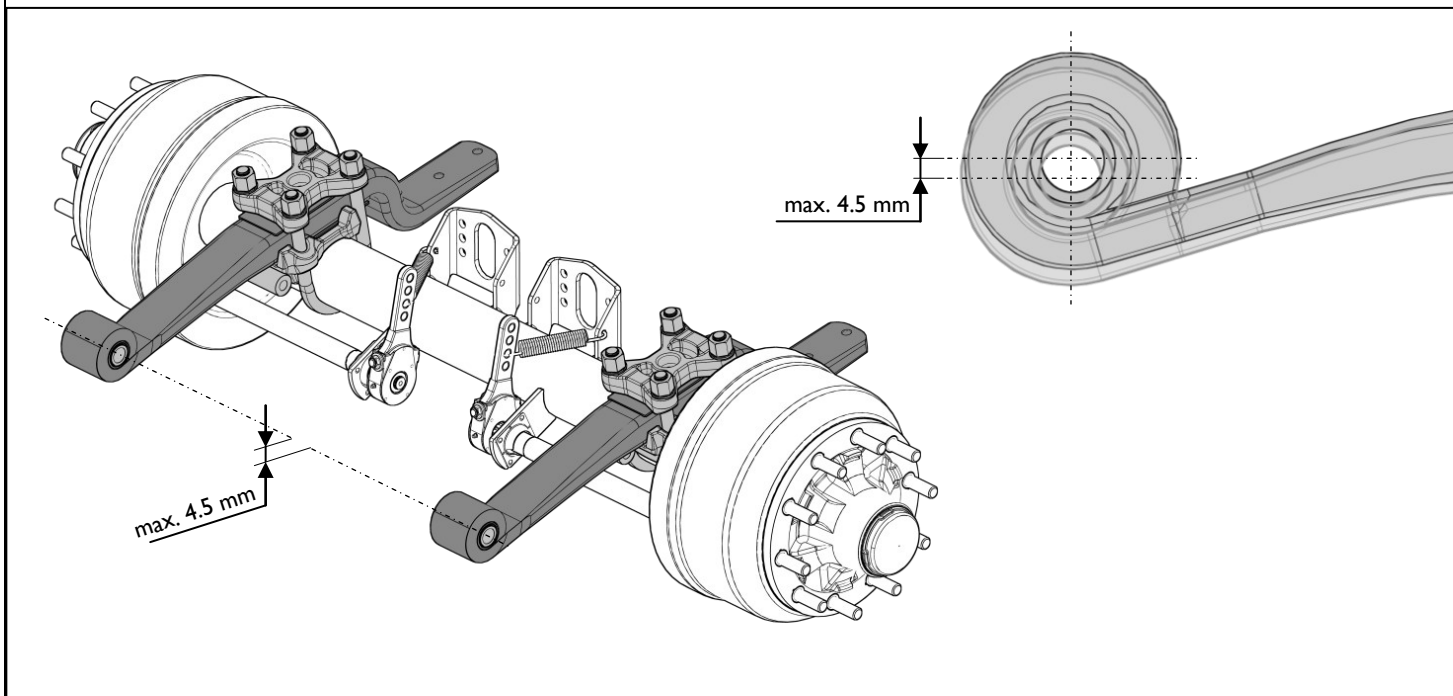


7. Alignment of system & axle

7.1 Alignment of air suspension versus axle

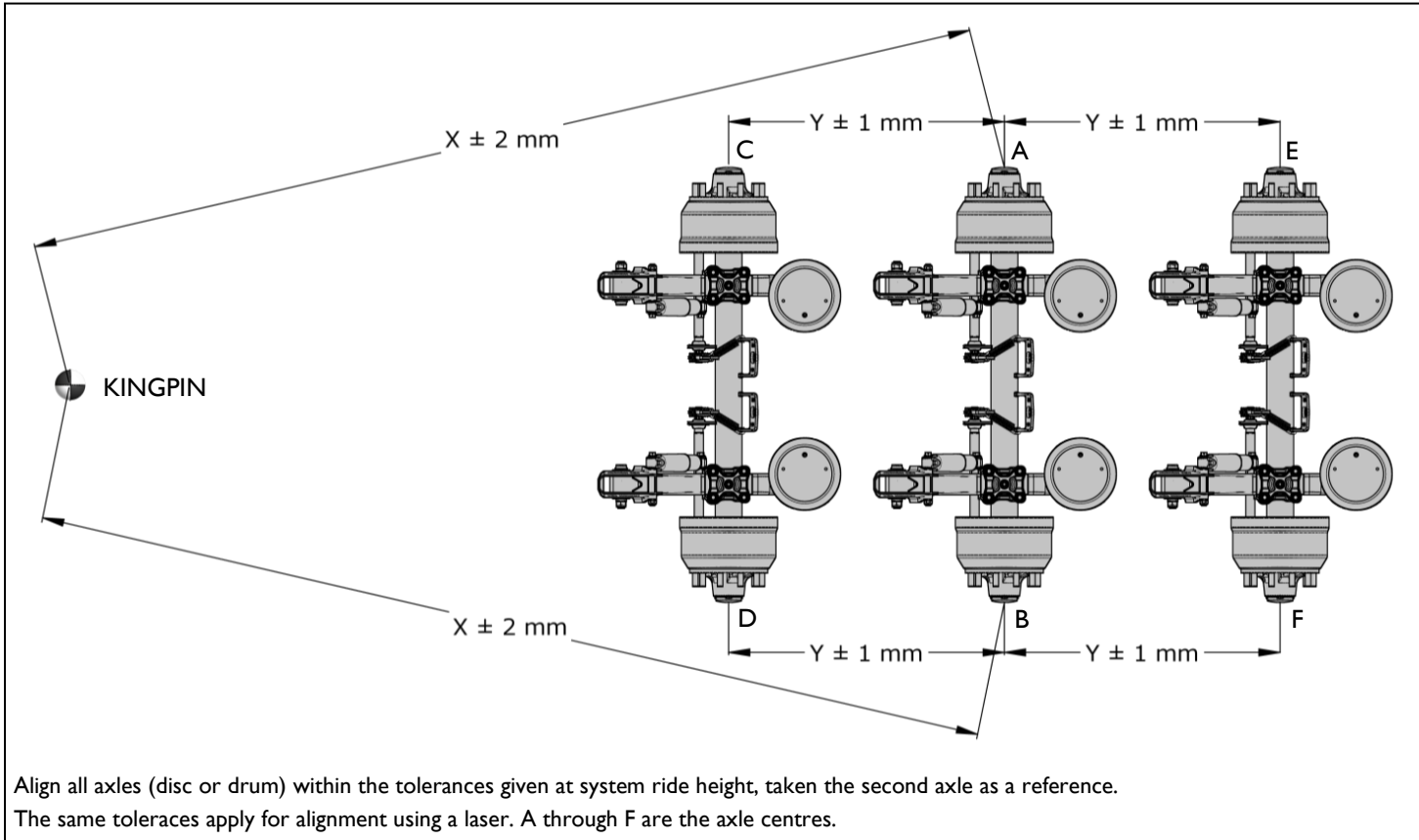


7.2 Alignment of trailing arm eye height

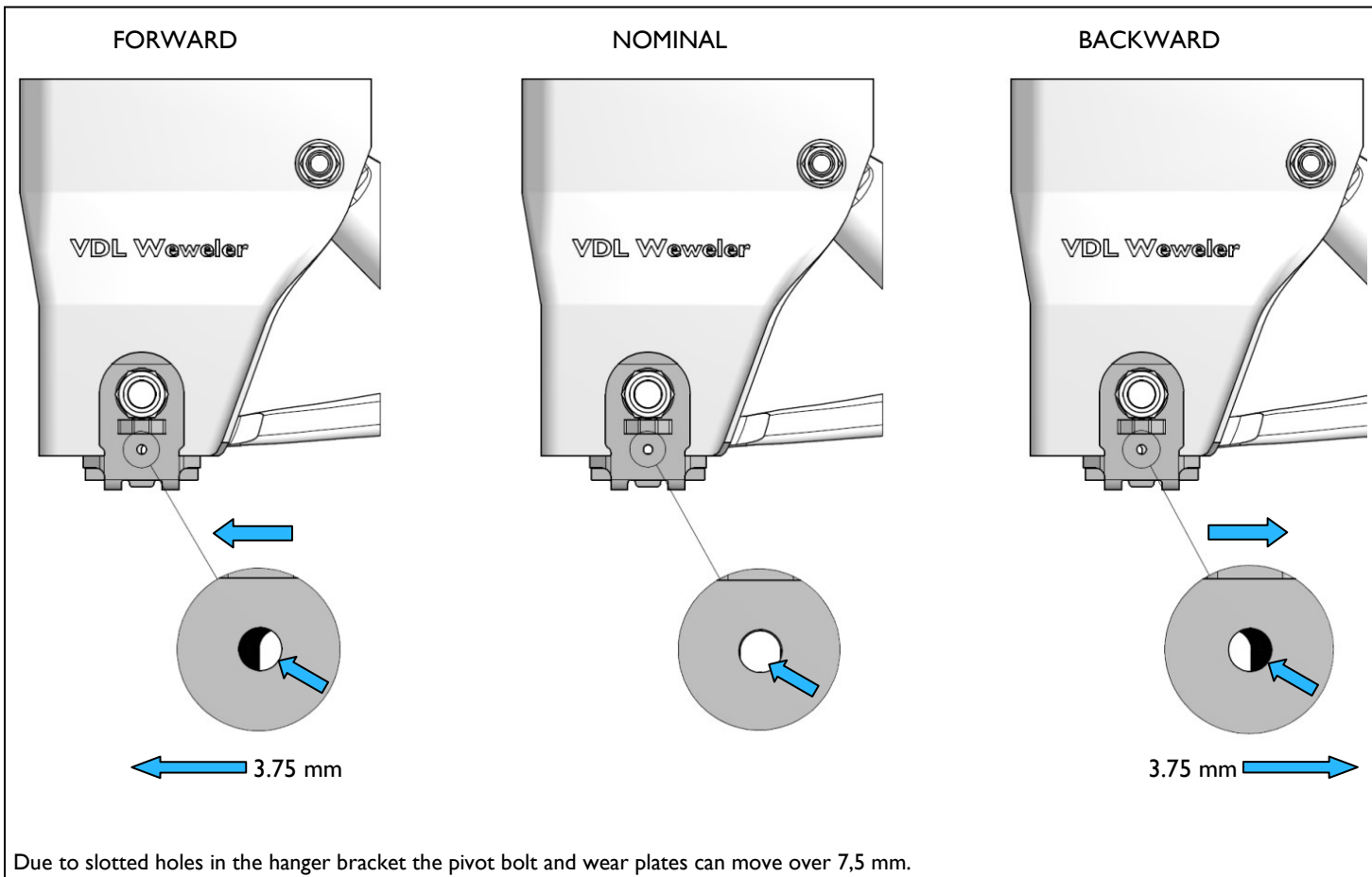


7. System & axle alignment

7.3 Alignment of axles

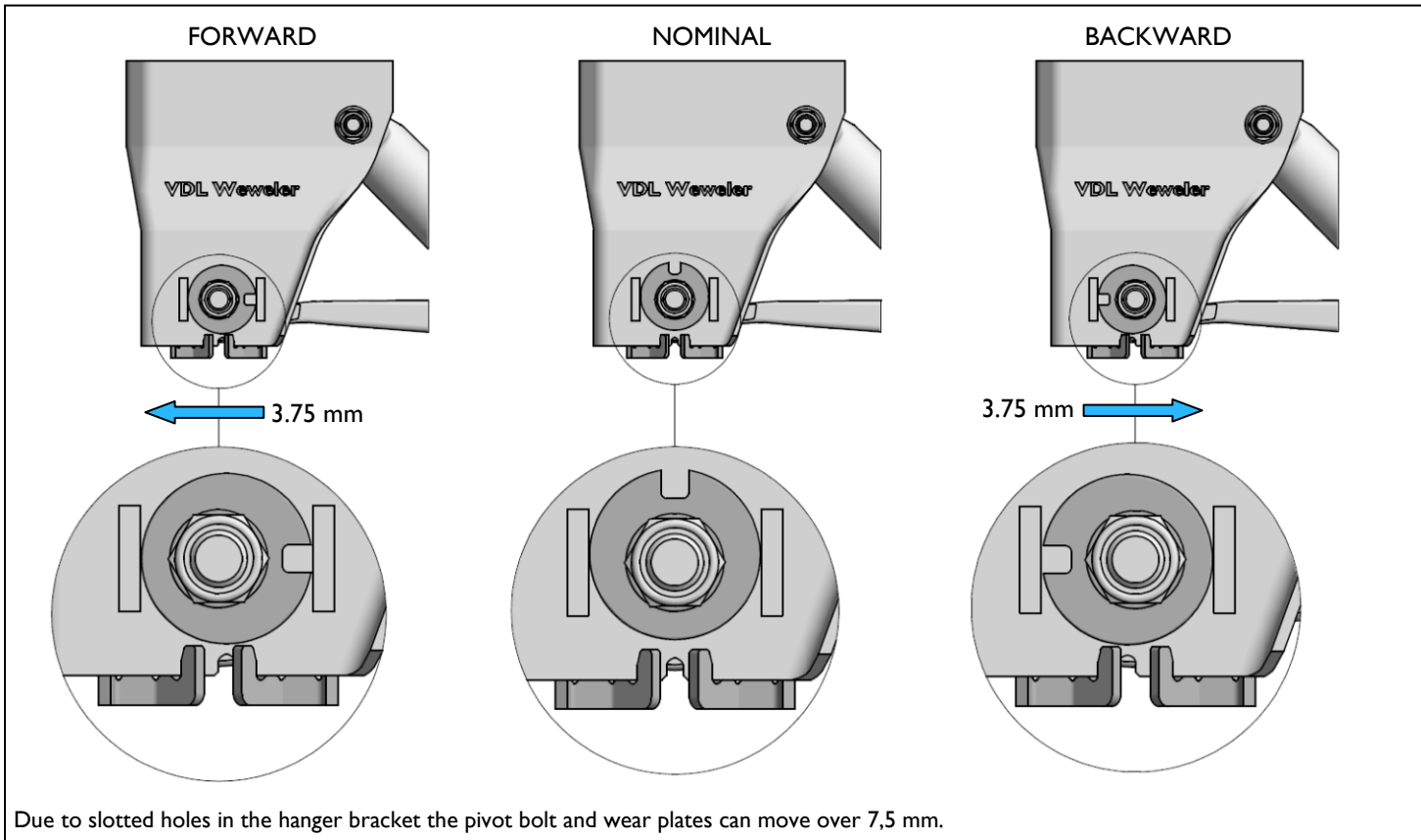


7.4 Adjusting the standard hanger bracket alignment



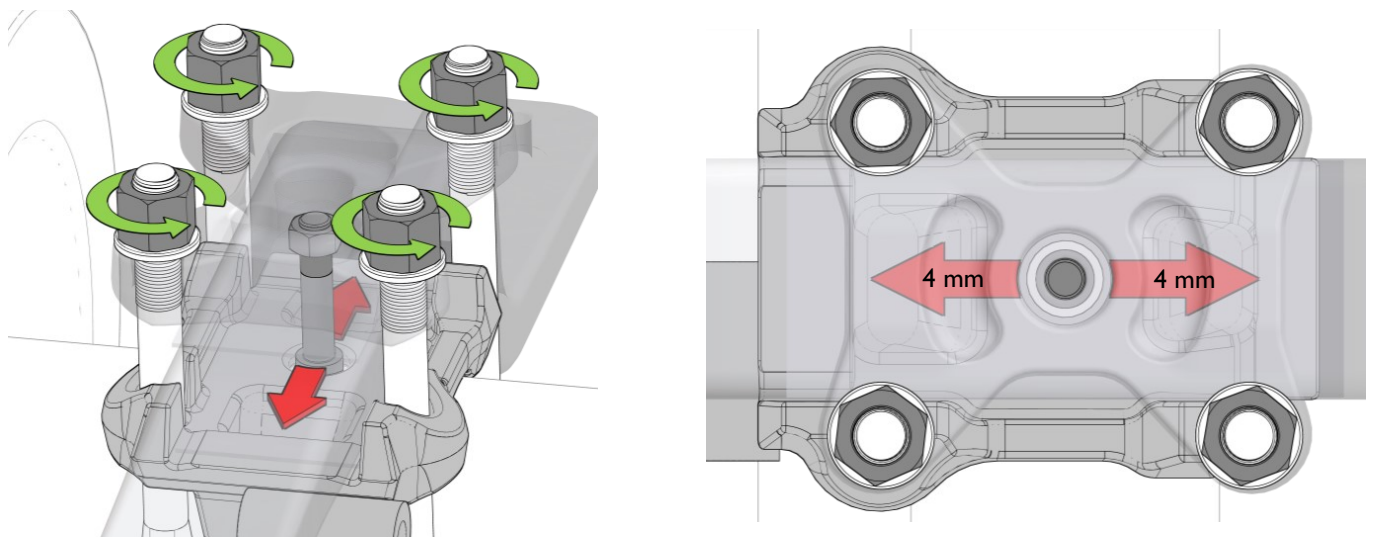
7. System & axle alignment

7.5 Adjusting the hanger bracket alignment with excentric disc



7.6 Adjusting the axle seat clamping alignment

1. Check if the axle alignment is within the prescribed tolerances (see section 7.3). If the axle need (re-)aligning, follow the next steps for axle alignment in the axle seat clamping.

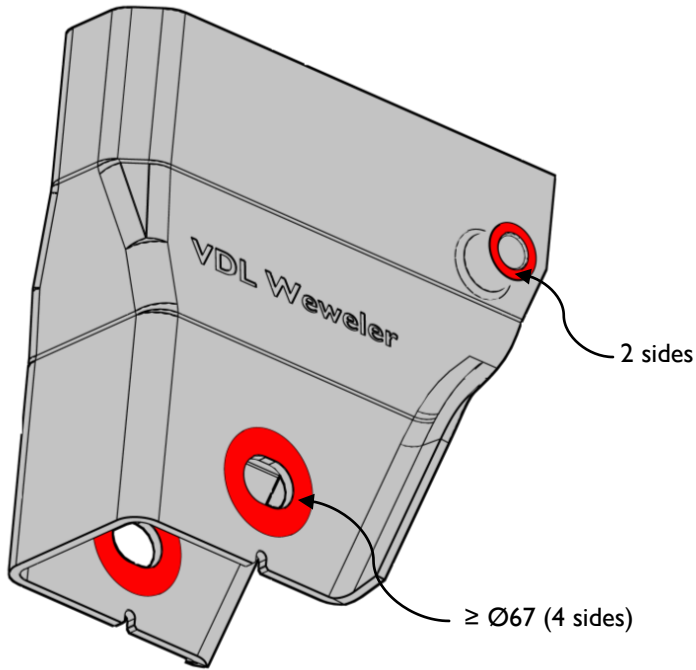


2. Loosen (U-)bolt nuts, until the axle can move in the clamping (nuts remain on (U-)bolt). Due to the clamping construction the aligning can now be adjusted within ± 4 mm (each side).
3. Align the axle at ride height within the prescribed tolerances (section 7.3).
4. Tighten (U-)bolts at ride height according the prescribed procedure (see section 10).

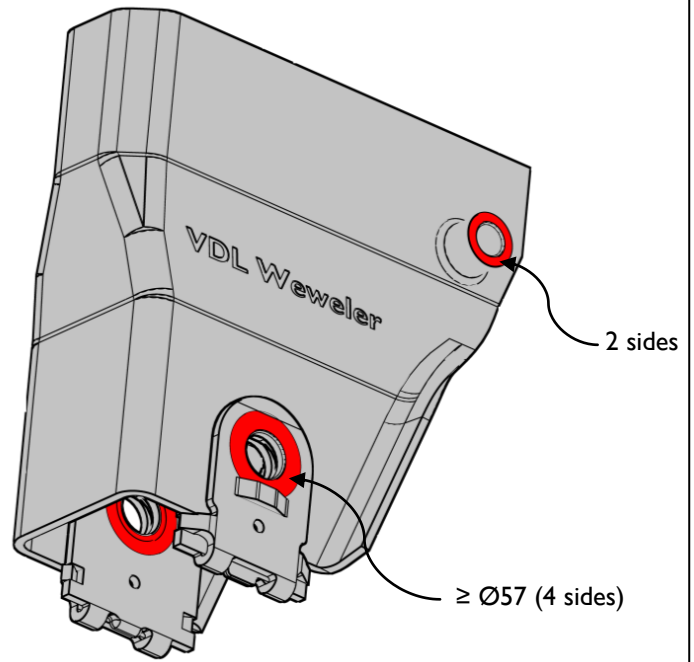
8. Paint instruction

The red marked areas are only allowed to be primered, KTL coated (max. 30µm) or zinc dipped (50 - 100µm).

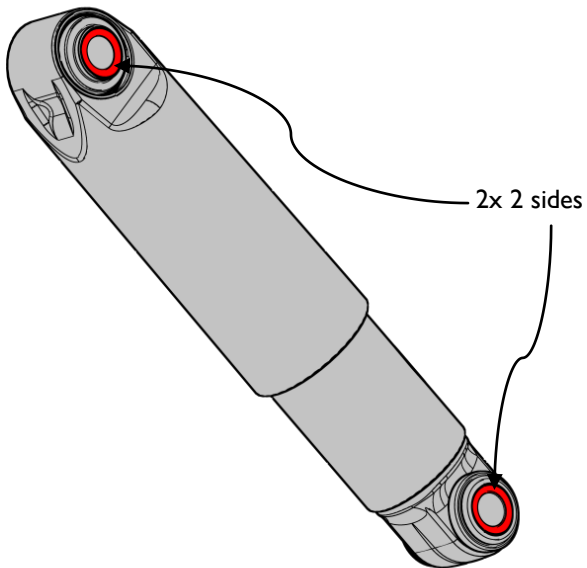
Hanger bracket with alignment option



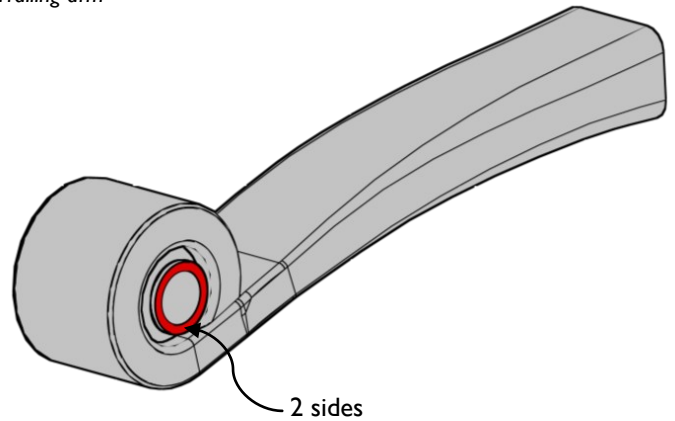
Hanger bracket with fixed welded wear plates



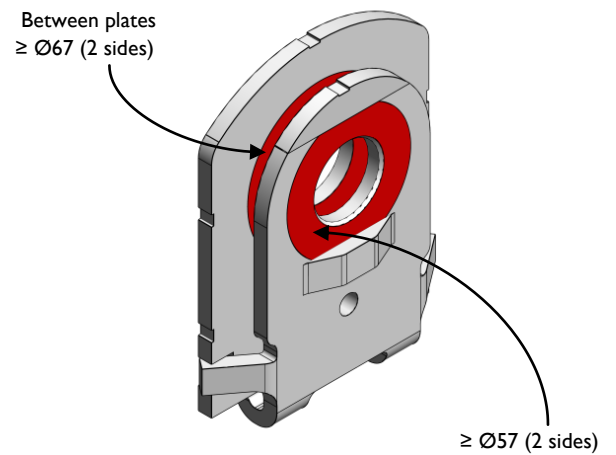
Shock absorbers



Trailing arm



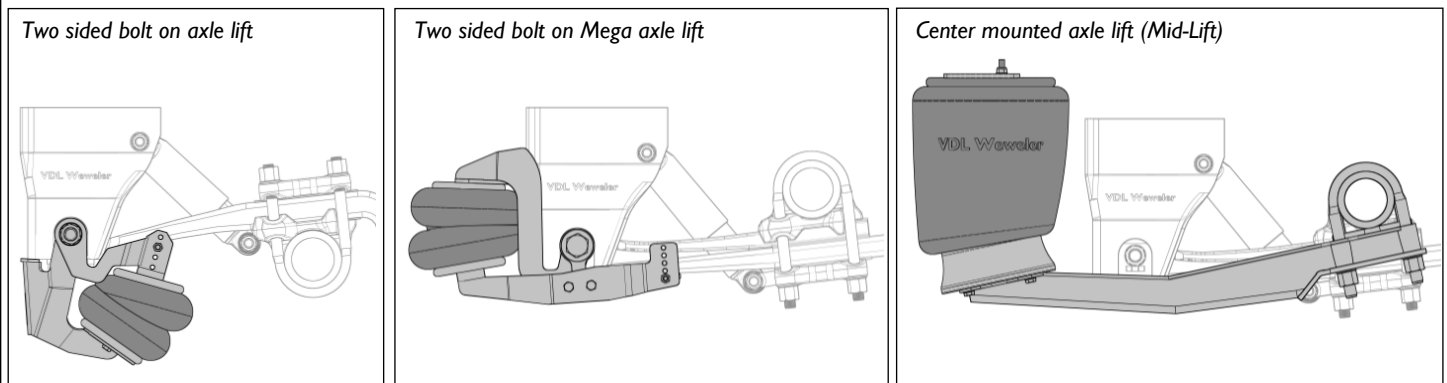
Wear plate (standard already KTL coated)



9. Axle lift

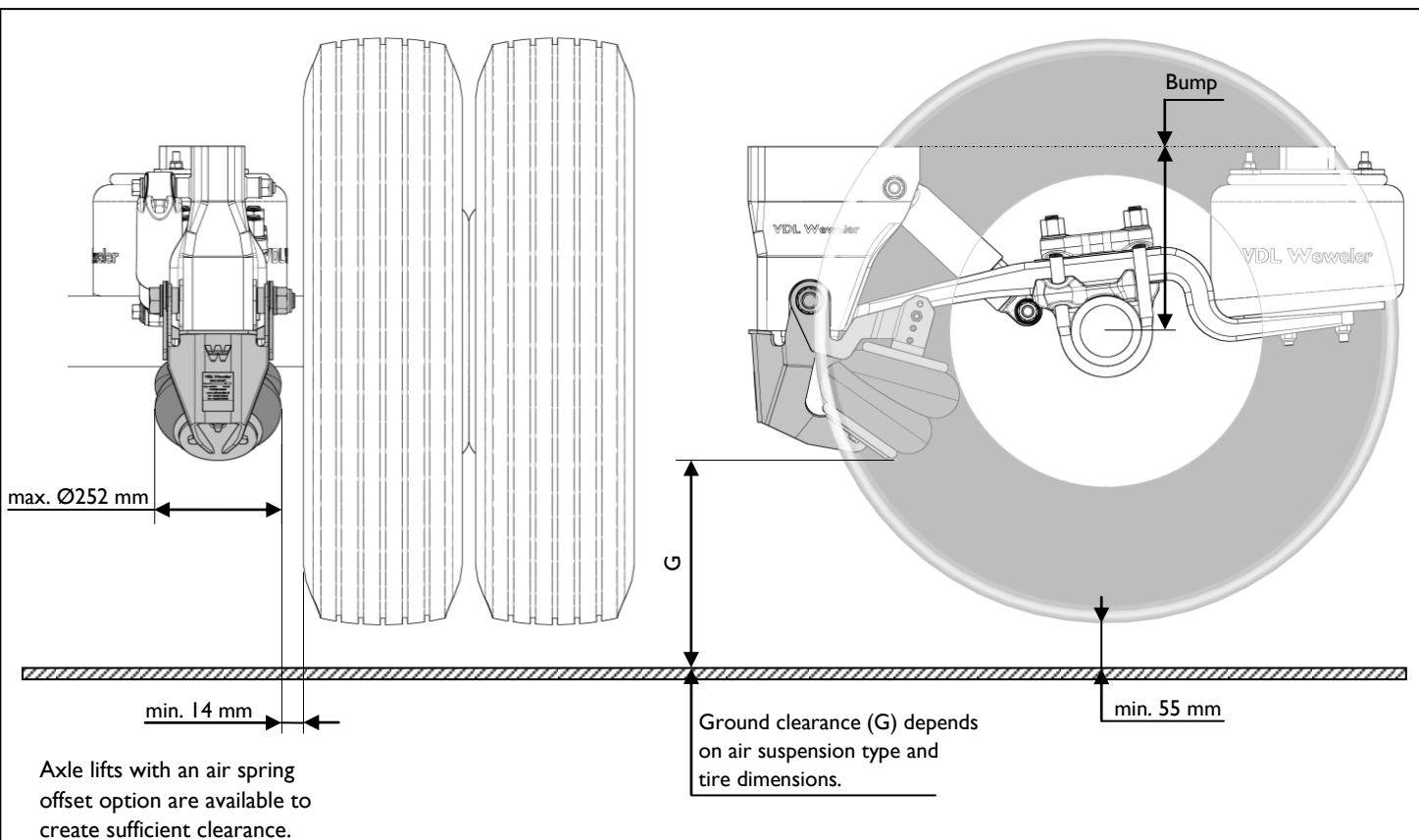
9.1 Axle lift versions

For the MBS-HD air suspension range several axle lifts are available. Depending on the air suspension system and application the most suitable axle lift can be selected. Please check the available individual system drawings or contact VDL Weweler for the required correct axle lift version. The axle lifts can be classified into three categories:



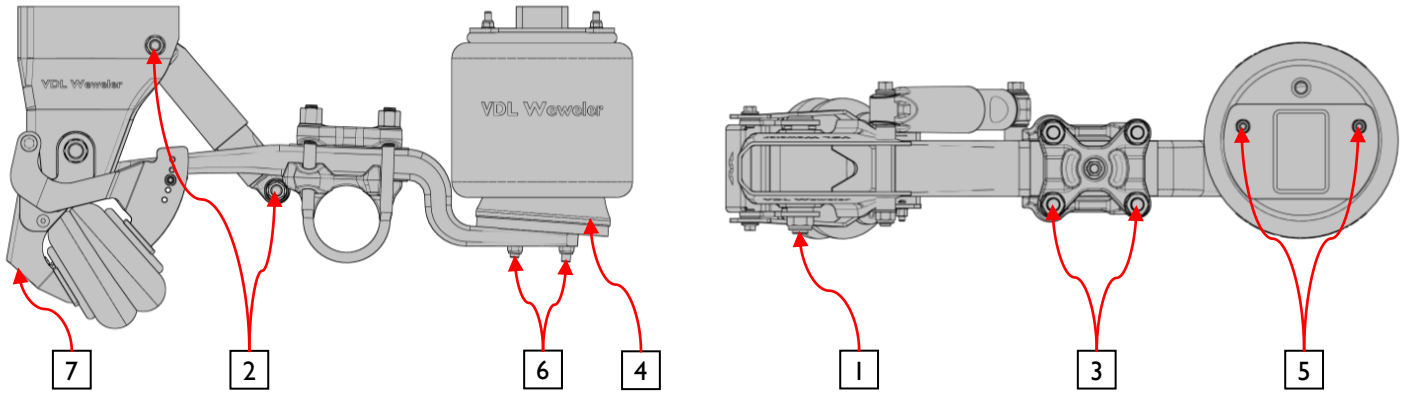
The maximum allowed pressure for all versions is 8,5 bar. For center mounted axle lifts (Mid-Lift) a residual pressure of 0,5 bar is required when the axle is not lifted.

9.2 General clearances two sided axle lift



Always check the ground clearance (G). Minimum allowed ground clearance is 50mm when the vehicle is standing level and on the suspension bump. The clearance between the road and tyre when the axle is lifted is the inbound axle travel minus the deformation of the tyre (min. 55 mm).

10. Torque settings MBS-HD Air Suspension



Item	Size	Width across flats (A/F)	Torque **		Inspection Field check (maintenance)
			Step 1 : Torque	Step 2 : Angle	
1 Pivot bolt ^{1) 2)}	M27	41	250 Nm (+25 / -0) + apply grease on 1/4 of thread surface *	270° (+27° / -13°)	1000 Nm
2 Shock absorber - side mounted ^{1) 2)}	M20	24 (bolt) / 30 (nut)	200 Nm (+20 / -0)	180° (+18° / -9°)	550 Nm
	M20	24 (bolt) / 30 (nut)	550 Nm (+50 / -0)	-	550 Nm
	M24	36	620 Nm (+50 / -0)	-	620 Nm
3 U-bolts M22 ³⁾	M22	32	600 Nm (+25 / -0)	-	600 Nm
	M24	36	800 Nm (+50 / -0)	-	800 Nm
4 Air spring (bottom)	M12	19	65 Nm (+10 / -0)	-	65 Nm
	M16	21	200 Nm (+20/- 20)	-	200 Nm
5 Air spring (top)	M12	19	30 Nm (+10 / -0)	-	30 Nm
	M22	32	65 Nm (+0 / -15)	-	50 Nm
6 Air spring support plate (Ø300)	M12	19	65 Nm (+10 / -0)	-	65 Nm
	M16	24	200 Nm (+20/- 20)	-	200 Nm
7 Axle lift	See separate axle lift data sheets for the correct torque settings for each type of axle lift.				

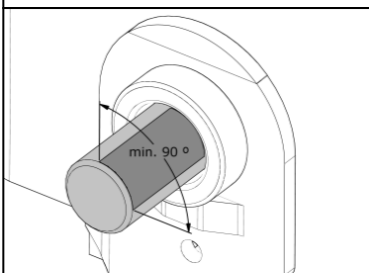
¹⁾ Tighten at ride height.

²⁾ During angle tightening of the nut/bolt it is essential to secure the counterside.

³⁾ Tighten U-bolts evenly and crosswise.

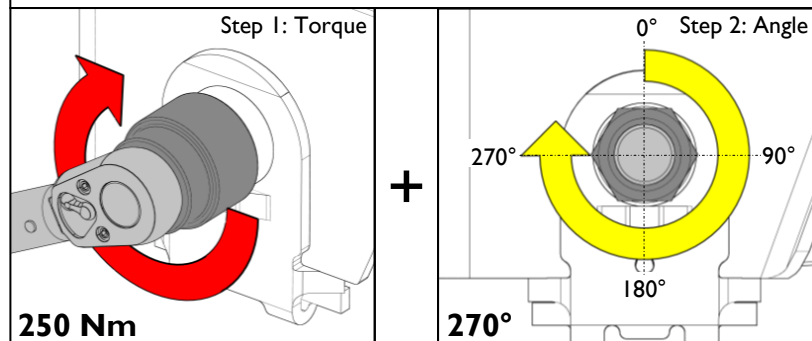
Always tighten or check the fasteners with a calibrated torque wrench.

* 1/4 THREAD SURFACE GREASE



Recommended grease specification:
DIN51 502, KPHC 2 P-30

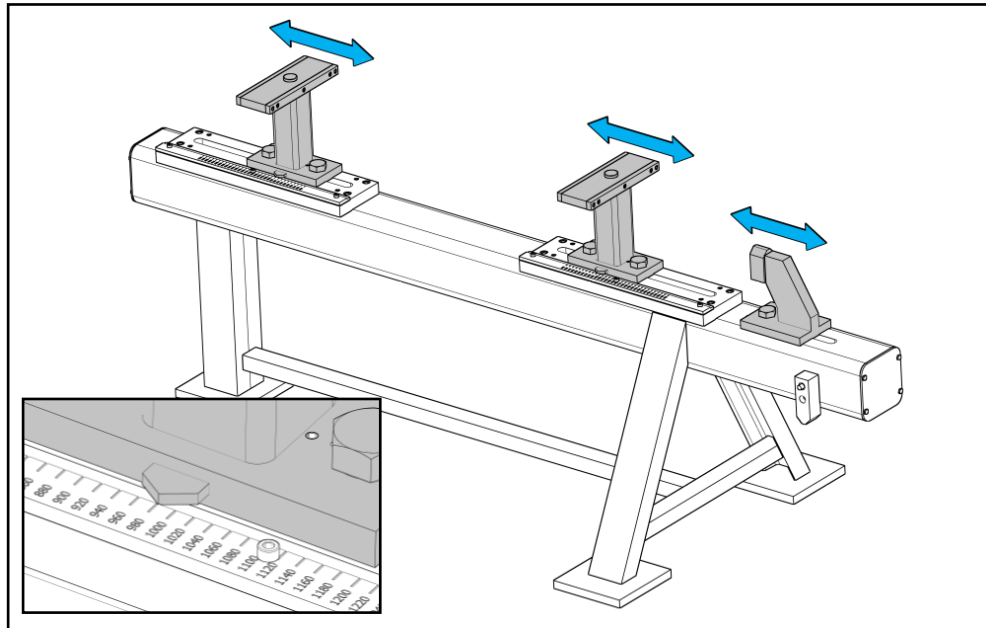
** ANGLE TIGHTENING METHOD (example pivot bolt)



11. Air suspension on axle assembly

11.1 Welding Jig

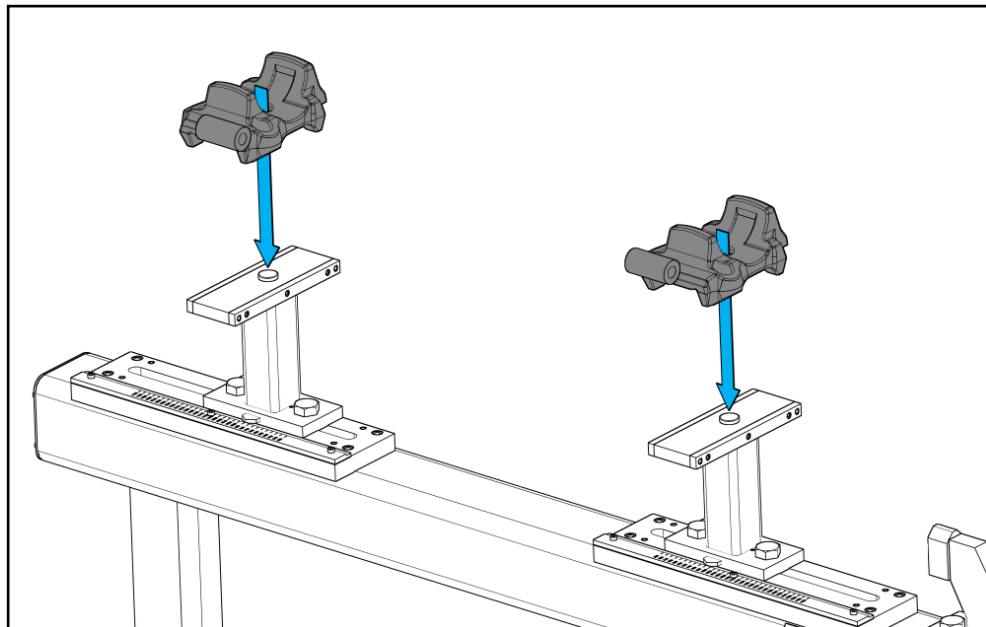
Set up welding jig for corresponding axle. The outer support is positioned against the hubface in the next steps. Adjust the two axle seat supports to the correct spring track. In this example the spring track is set at 980mm.



11.2 Axle seats

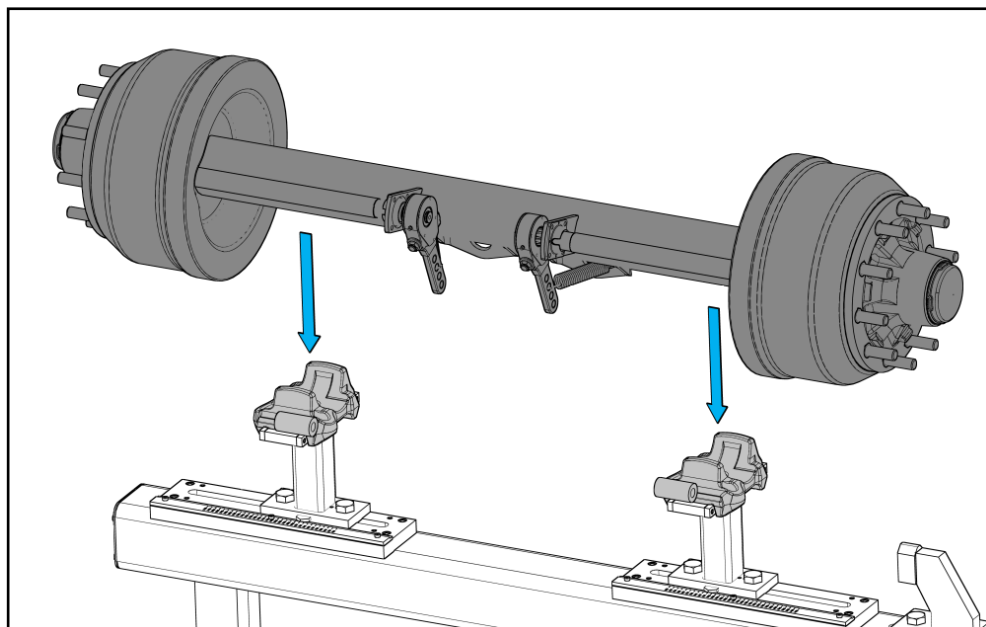
Place the axle seats on the welding jig.

This installation guide shows the HD axle clamping for round axles. Other available axle clampings can be found in section 14.



11.3 Axle

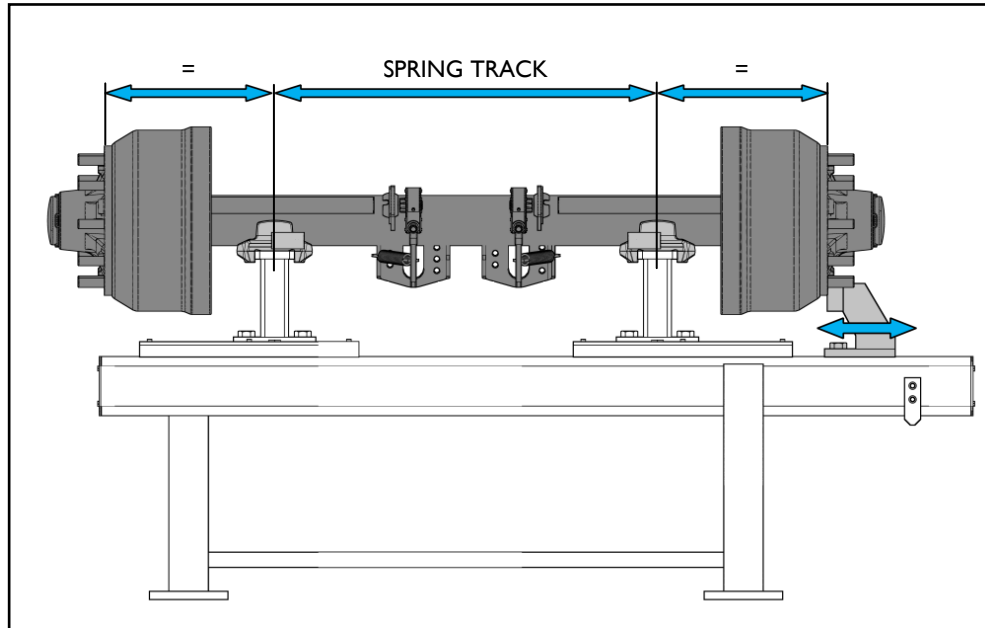
Place the axle on the axle seats. Make sure the axle is positioned in the correct driving direction.



11. Air suspension on axle assembly

11.4 Align axle

Align the axle in relation to the axle seats. Make sure the distance between the axle seats left and right to the hubfaces are equal. Adjust and secure the welding jig side support in the correct position.



11.5 Position brake booster (bracket)

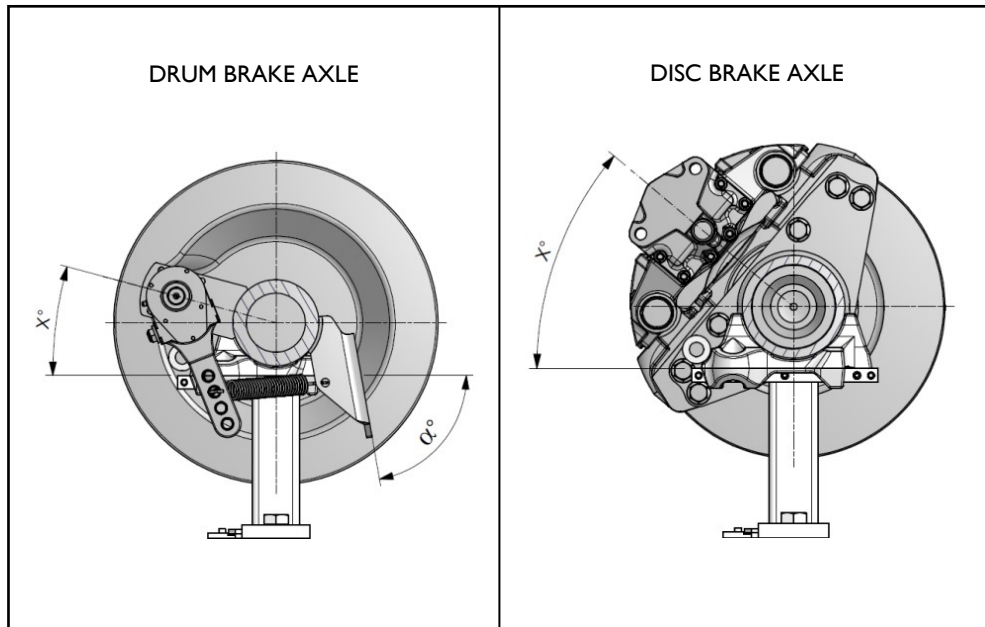
Check the position of the brake booster bracket (angle α) or camshaft (angle X) for drum brake axles.

Check the position of the brake booster (angle X) for disc brake axles.

Follow the prescribed angle as stated by VDL Weweler or the axle manufacturer.

Mind under- or overslung systems.

The images show an overslung configuration.

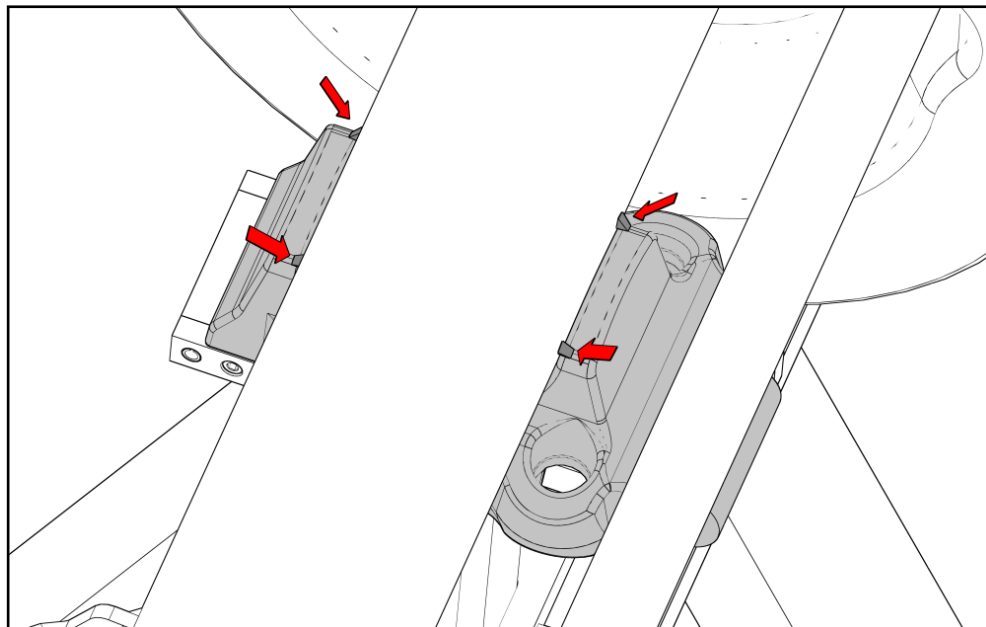


11.6 Tack welding axle seats

Make sure the axle is supported on the axle seat support surfaces.

Tack weld the axle seats on the four indicated positions on the front and the rear on both sides.

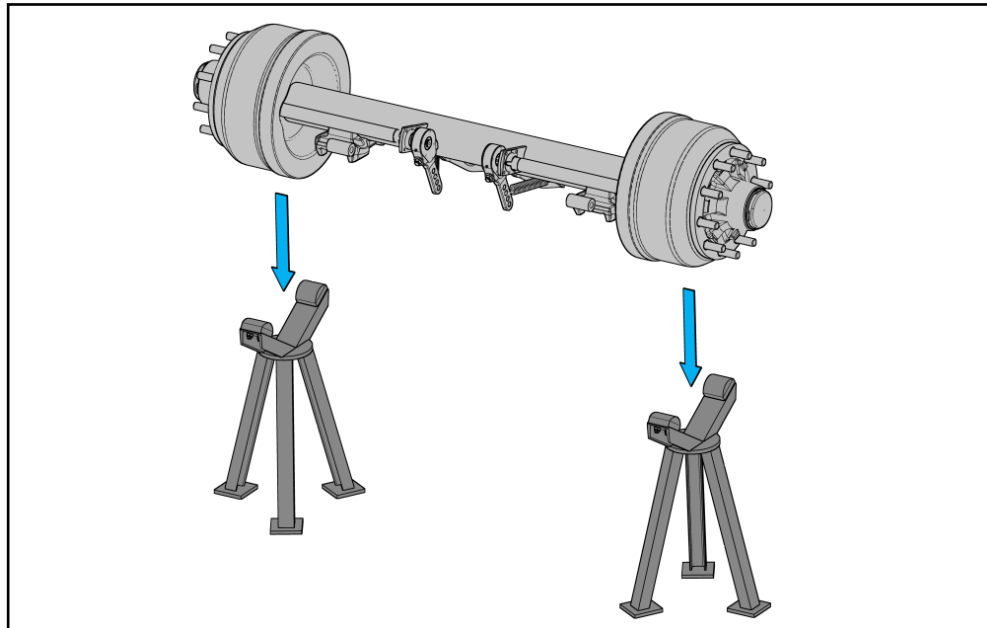
See instructions: Section 4



11. Air suspension on axle assembly

11.7 Assembly supports

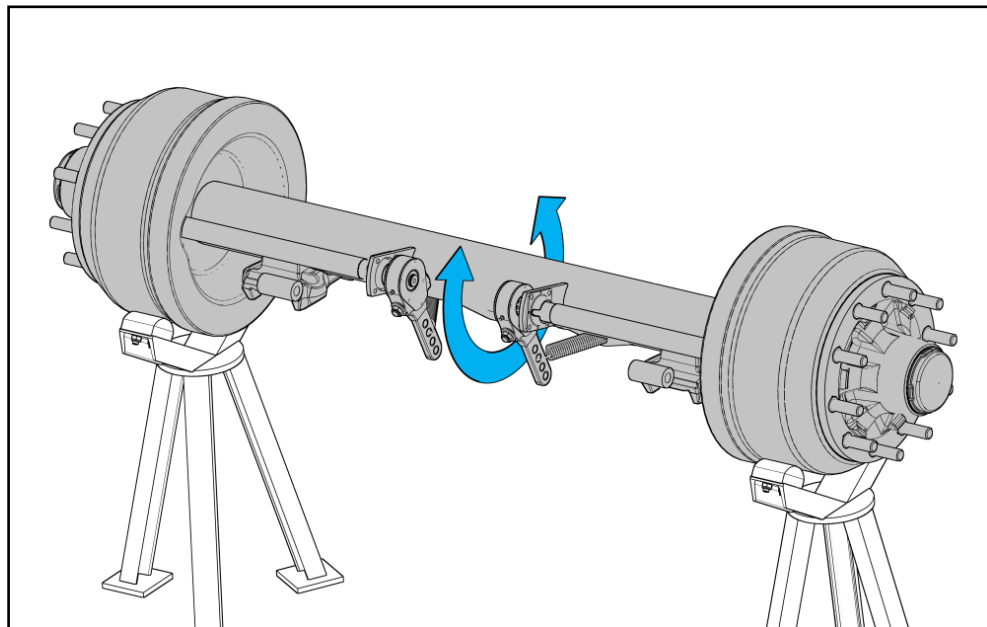
Place the axle on the assembly supports so that the axle can still be rotated.



11.8 Welding preparation

Rotate the axle beam to allow for inverted welding (PA/PB welding position).

See instructions: Section 4



11.9 Welding axle seats

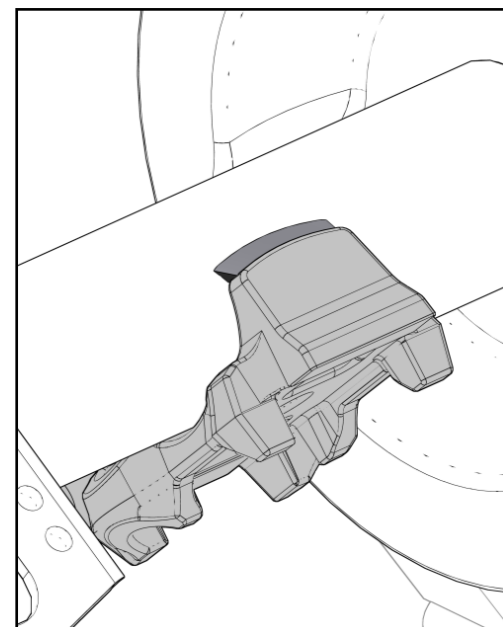
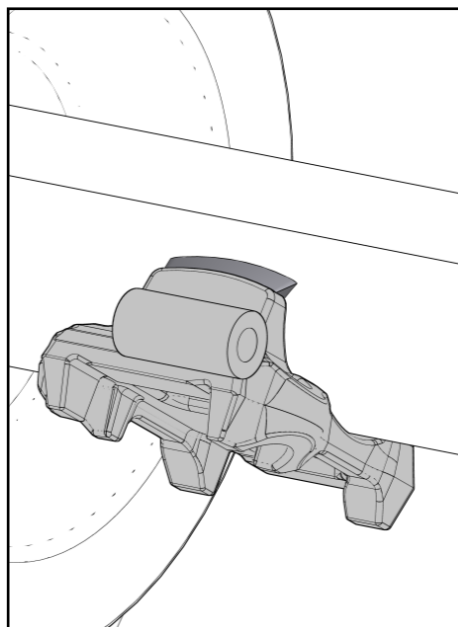
Weld the axle seats to the axle beam according to the instructions.

See instructions: Section 4



DO NOT WELD THE AXLE SEAT TO THE TRAILING ARM!!

TO PREVENT DAMAGE TO THE BEARINGS AND TRAILING ARM, NEVER CONNECT THE EARTH CONNECTOR TO THE AXLE HUB, WHEEL END OR TRAILING ARM!

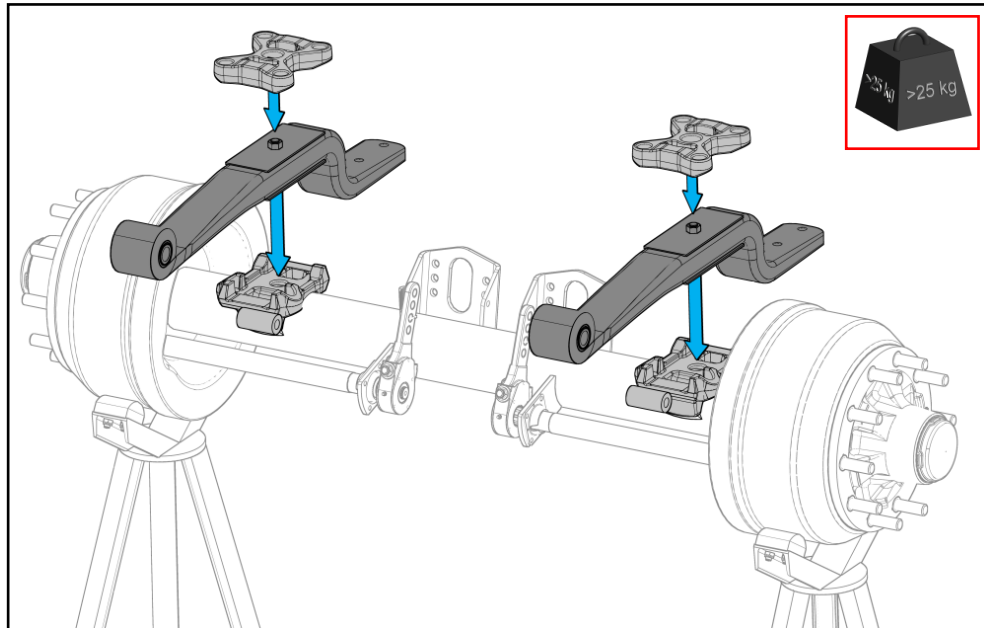


11. Air suspension on axle assembly

11.10 Trailing arms

Place the trailing arms on the axle seats. Make sure the center bolt is placed in the center hole of the axle seat.

Place the u-bolt plates on top of the trailing arm. Make sure the center bolt is placed in the center hole of the u-bolt plate.

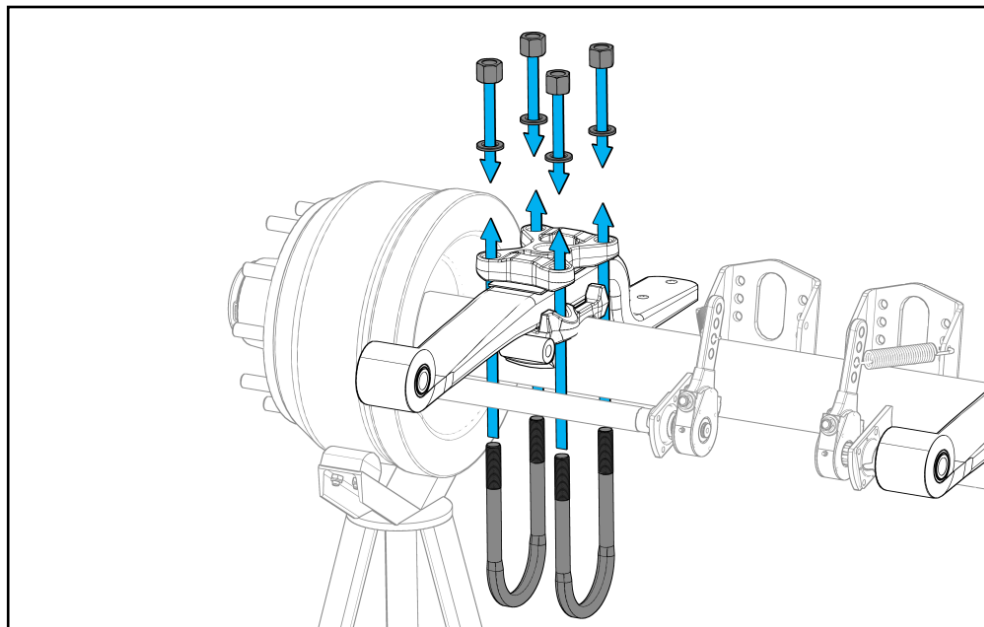


11.11 U-Bolts

Place the u-bolts around the axle and through the axle seat, u-bolt plate and washers and tighten the nuts slightly (hand tighten) until the u-bolts are positioned against the axle tube.

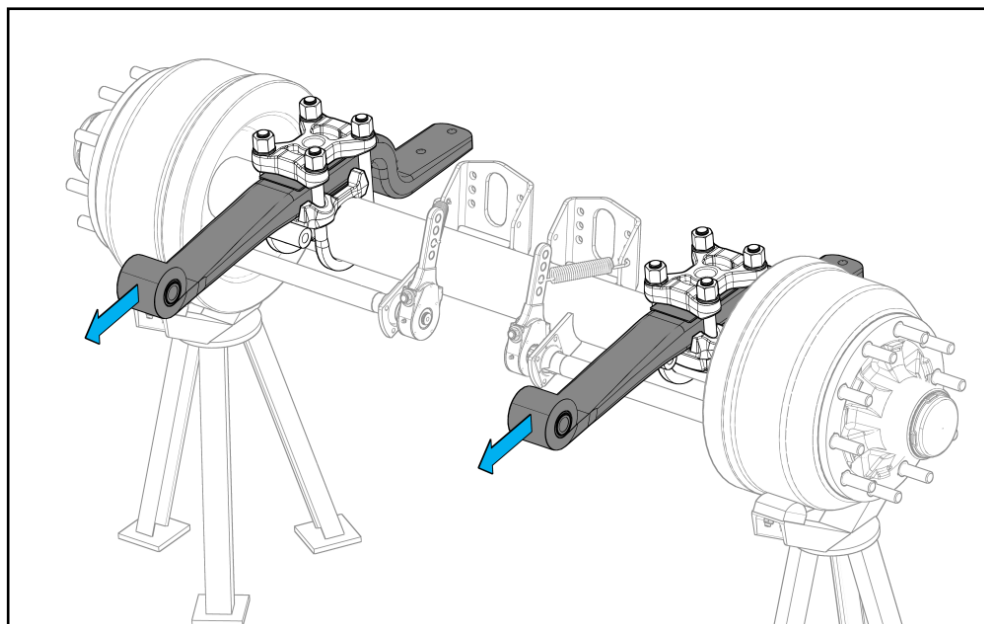
Repeat the same procedure for the other side.

(In case of wheel nuts there are no washers present).



11.12 Clamping

Pull both trailing arms forward in the axle clamping as much as possible.



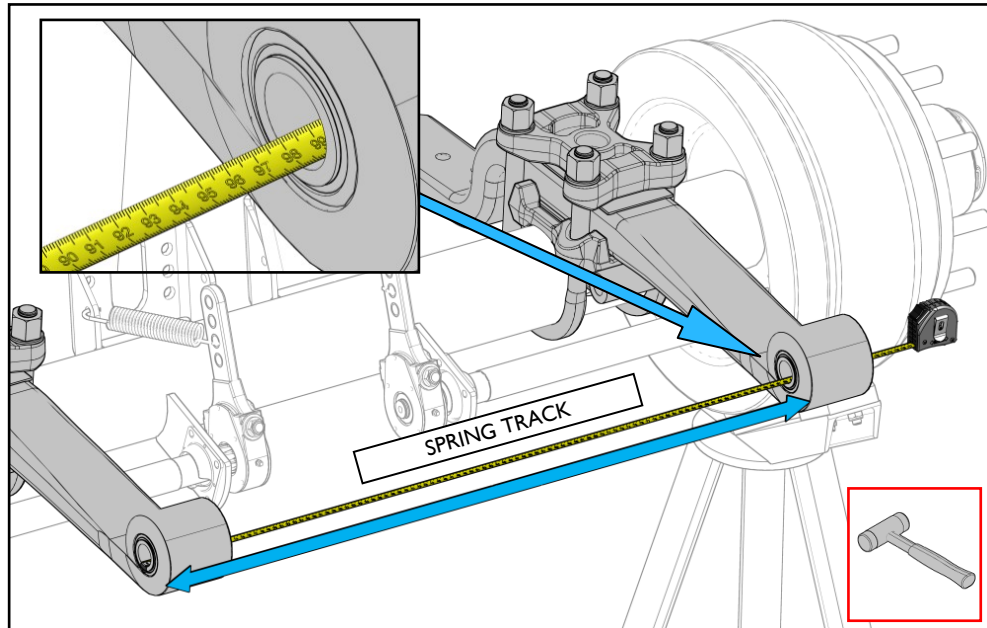
11. Air suspension on axle assembly

11.13 Spring track

Check the spring track again by measuring the distance through the spring eyes. In this example the spring track is 980mm.

If necessary adjust the spring track to the correct track by moving the trailing arm within the clamping using a rubber/plastic hammer.

See instructions: Section 7.1 & 7.2

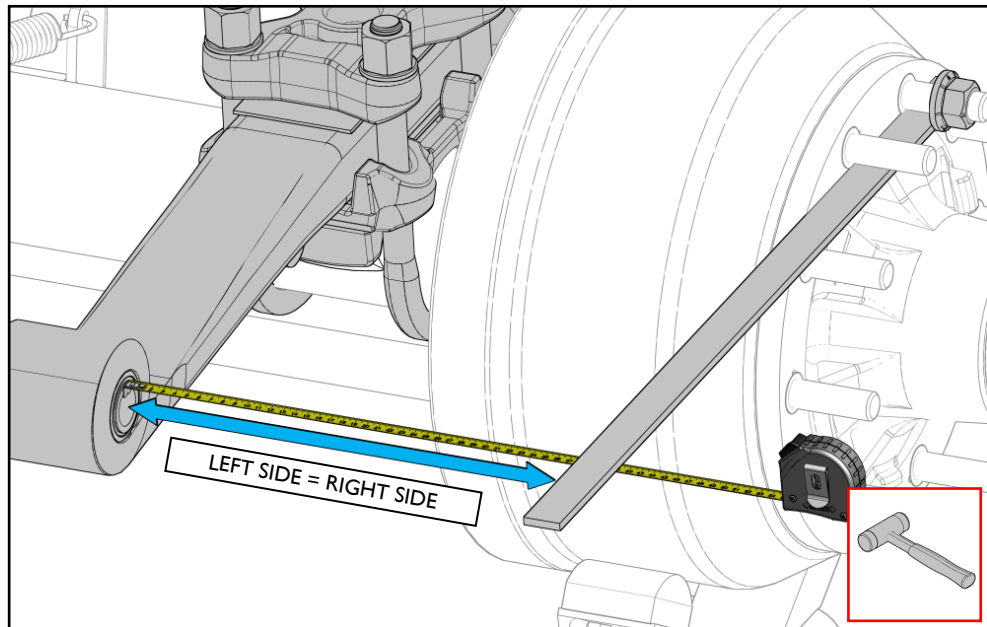


11.14 Alignment suspension to axle

Check the distance between the trailing arm eye and the hubface on both sides of the axle. This dimension should be the same on both sides.

If necessary adjust by moving the trailing arm within the clamping using a rubber/plastic hammer.

See instructions: Section 7.1 & 7.2

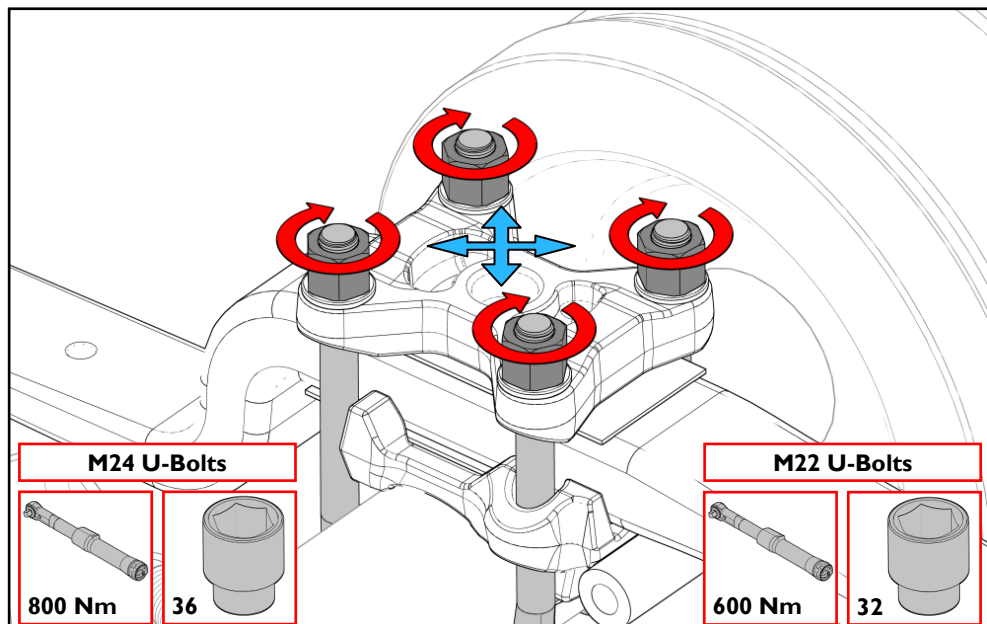


11.15 Tighten U-Bolts

Tighten the U-bolts crosswise and evenly on both sides.

After tightening check if the dimensions from step 11.13 and 11.14 are within tolerance.

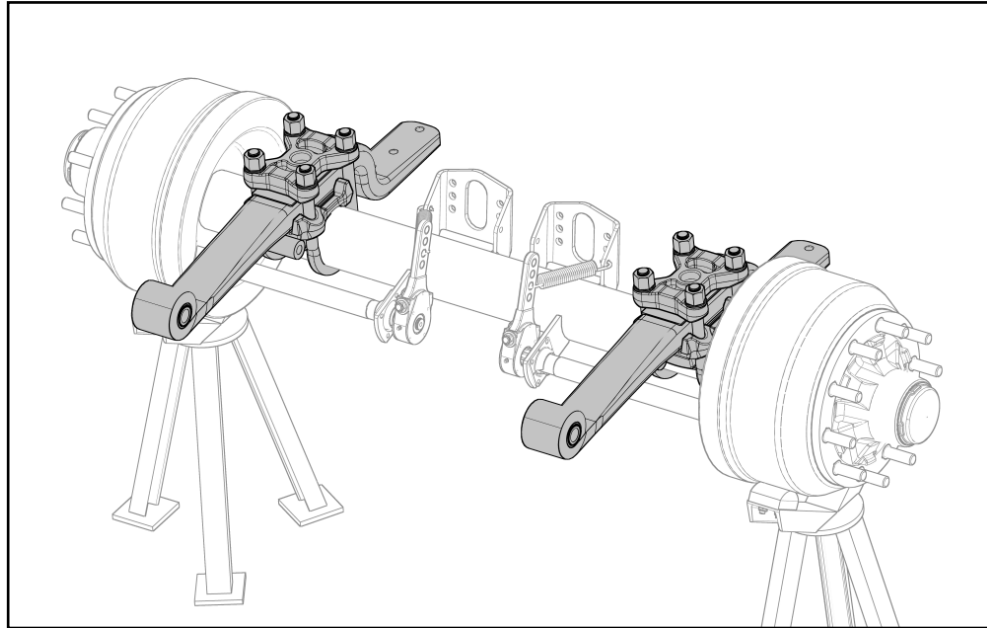
See tightening instructions: Section 10



11. Air suspension on axle assembly

11.16 Axle & suspension assembly

Finished sub-assembly of the air suspension clamping on the axle.



After step 11.16 there are two options to complete the system assembly:

- A.** First mount the hanger brackets to the suspension system and then weld the complete system to the trailer chassis.
Follow the steps from section 12: Final air suspension assembly 1
- B.** First weld the hanger brackets and pedestals (if present) to the trailer chassis and then mount the air suspension with axle to the chassis.
Follow the steps from section 13: Final air suspension assembly 2


12. Final air suspension assembly I

12.1 Hanger brackets

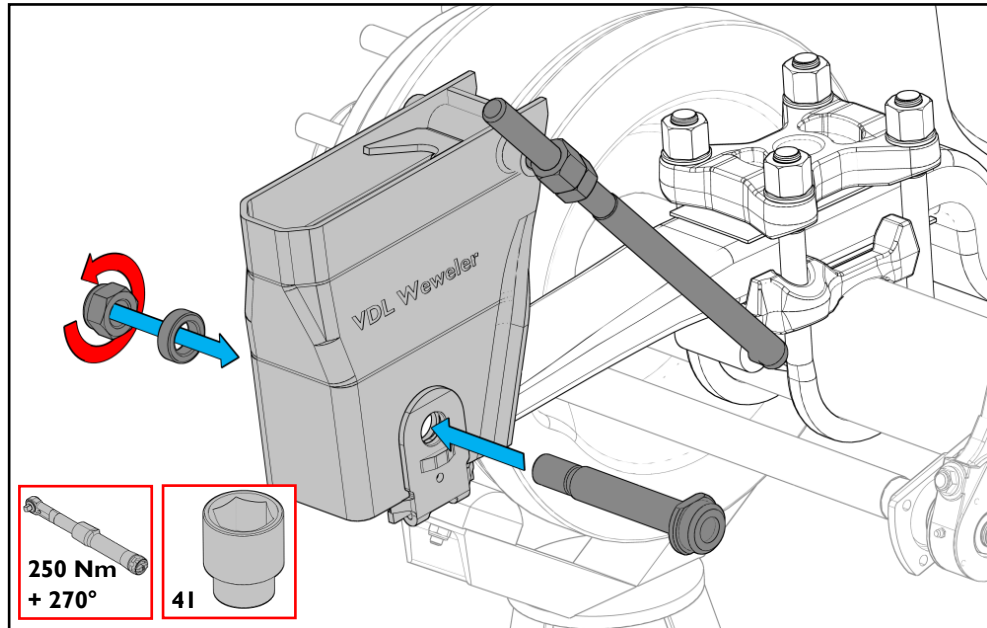
Place the hanger brackets pivot bolts, nuts and washers. Use a mounting tool (f.e. as shown in drawing) and the shock absorber connection points to set the system **at ride height**. The shock absorber length at system ride height can be found on the system or application drawing.

Tighten the pivot bolt connection according to the instructions **at ride height**.

See tightening instructions: Section 10

 If an optional casted bracing is supplied. First weld this casting to the hanger bracket.

See instructions: Section 3.6



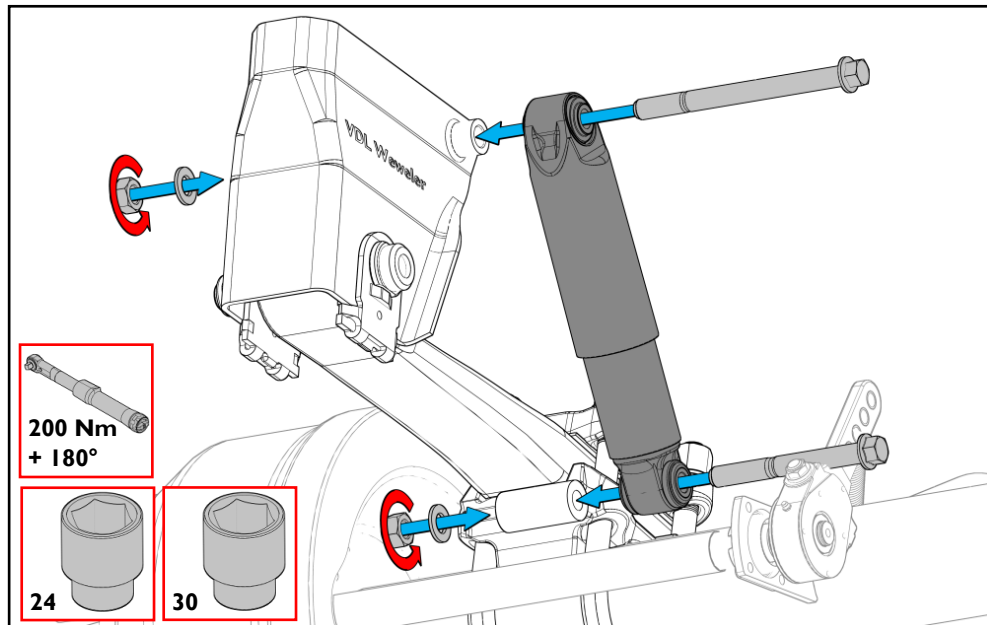
12.2 Shock absorbers (side mounted)

Remove the mounting tool and place the shock absorbers, bolts, nuts and washers.

If present, follow the instructions on the shock absorber (see Section 6).

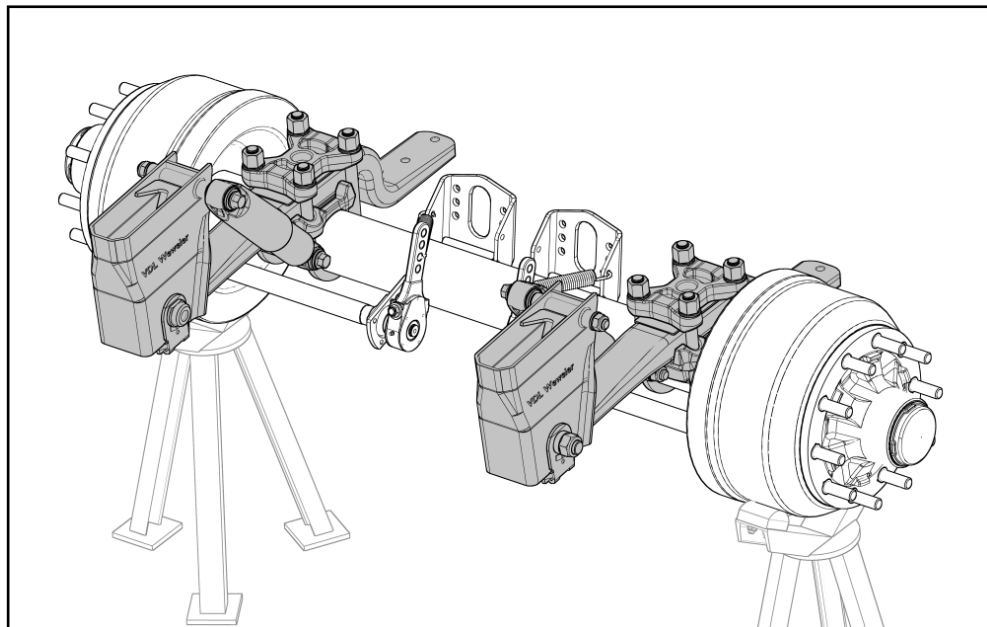
Tighten the top and bottom connection **at ride height** to torque according to the instructions.

See tightening instructions: Section 10



12.3 Suspension sub-assembly

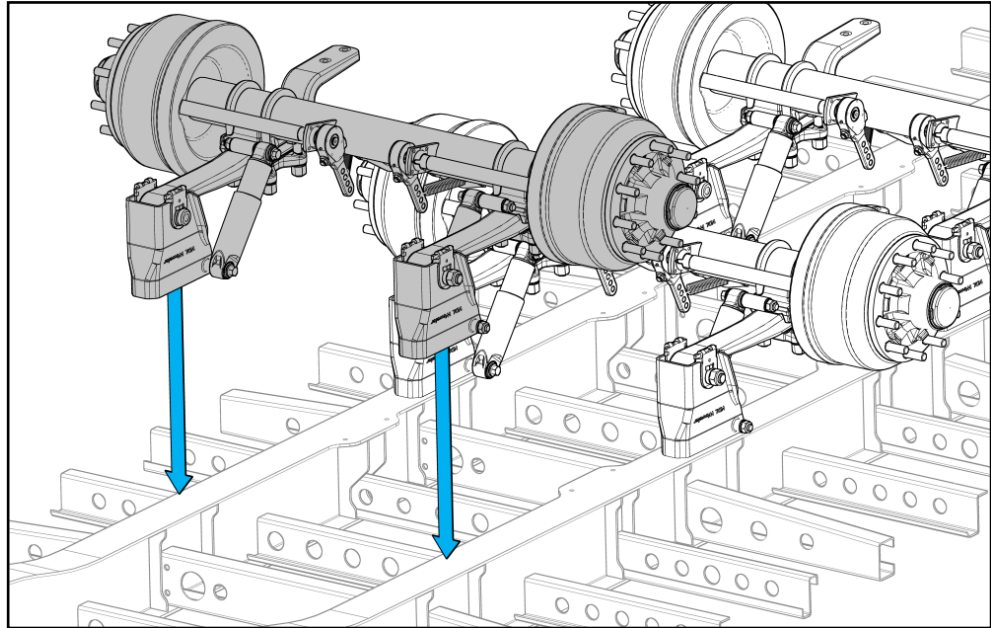
Air suspension sub-assembly finished. Ready for mounting on the chassis.



12. Final air suspension assembly I

12.4 Positioning on chassis

Place all three axle & suspension assemblies upside down on the chassis. Make sure all the axles are secured on the required **ride height** using axle supports or blocks under the suspension system.



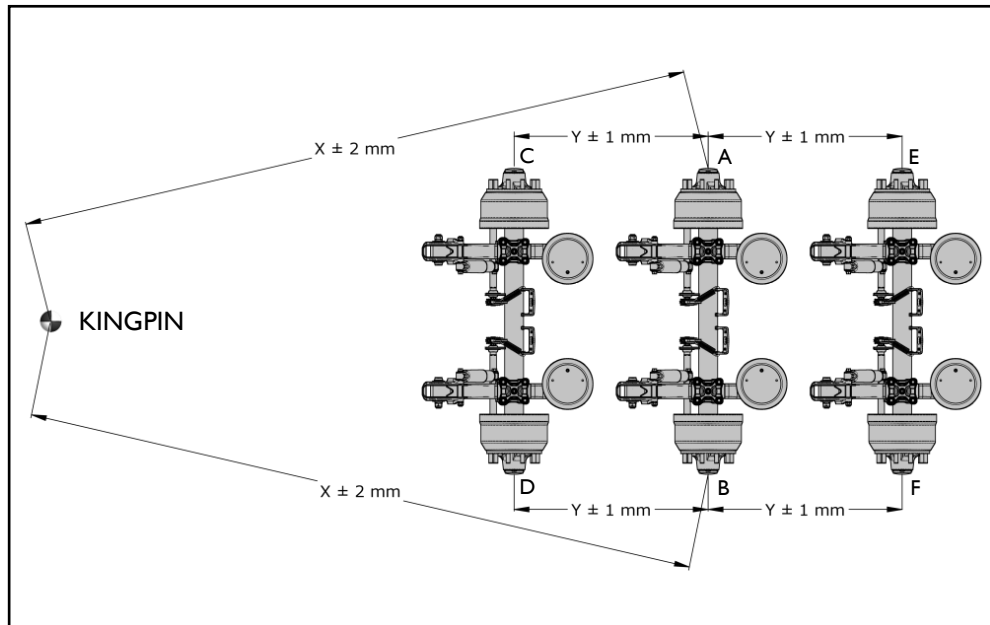
12.5 System alignment

Align all three axle within tolerances **at ride height** according to the instructions, taken the second axle as a reference.

The same tolerances apply for alignment using a laser.

A through F are the axle centres.

See instructions: Section 7.3

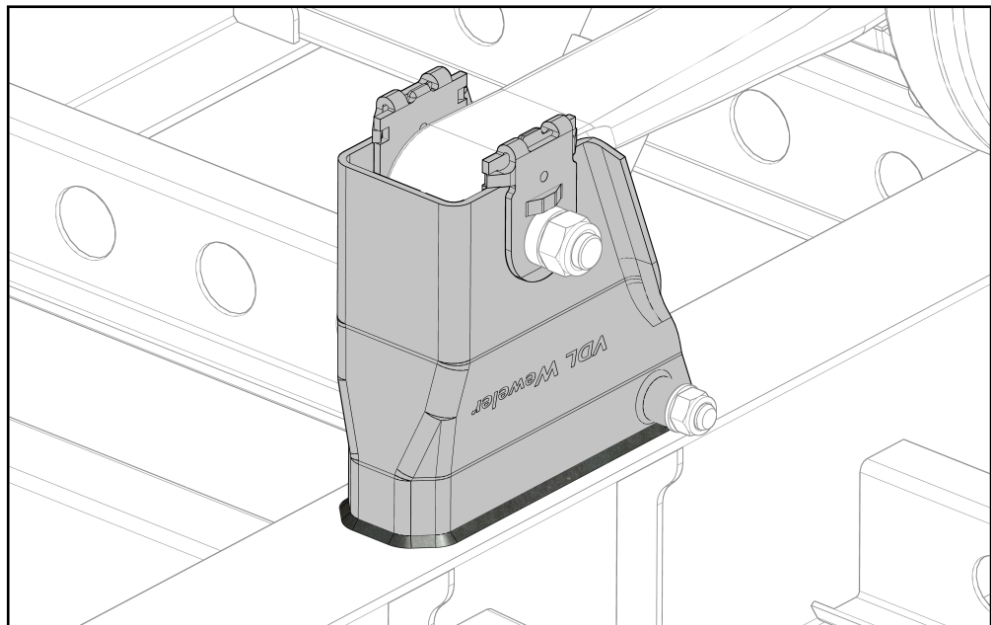


12.6 Welding hanger brackets

Weld all hanger brackets to the chassis according to the instructions.

The trailer builder is responsible that there are sufficient reinforcements in the vehicle chassis to guide the occurring forces on the hanger brackets.

See instructions: Section 3.3 & 3.4



12. Final air suspension assembly I

12.7a Option 1: Plate bracing

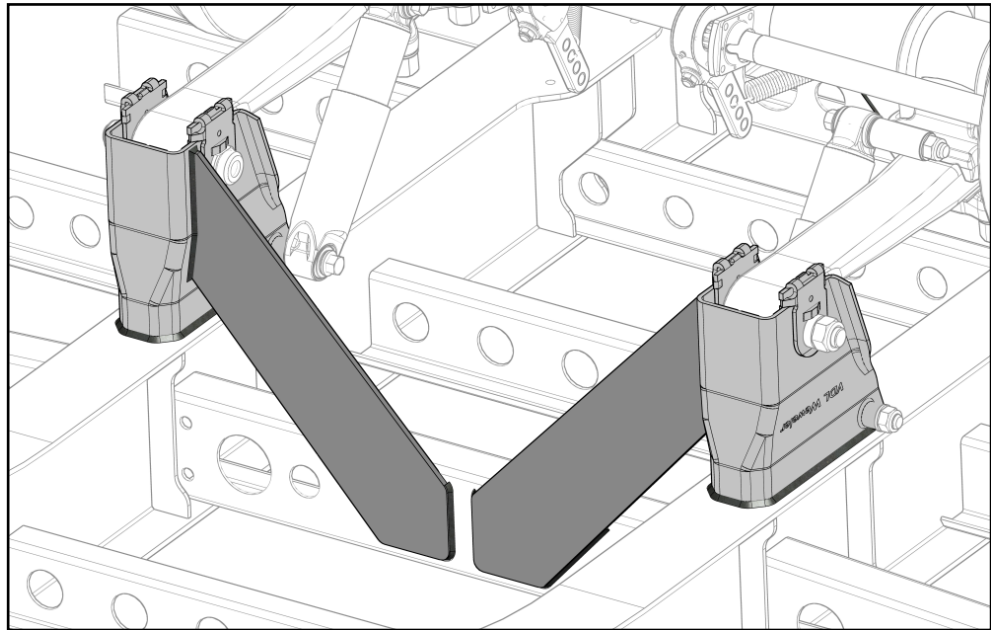
Weld the bracing plates to the hanger brackets and the cross members in the chassis according instructions.

The plates must be straight and are not allowed to be bended.

See instructions: [Section 3.5](#)



TO PREVENT DAMAGE TO THE BEARINGS AND TRAILING ARM, NEVER CONNECT THE EARTH CONNECTOR TO THE AXLE HUB, WHEEL END OR TRAILING ARM!



12.7b Option 2: Casting + plate bracing

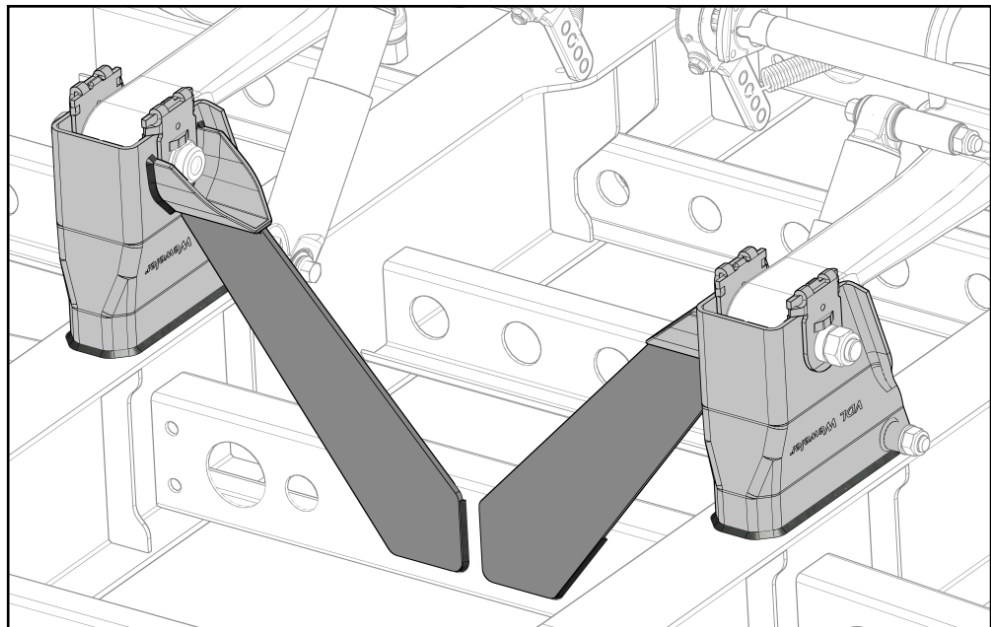
Weld the bracing plates to the casted bracing parts and the cross members in the chassis according instructions.

The plates must be straight and are not allowed to be bended.

See instructions: [Section 3.6](#)



TO PREVENT DAMAGE TO THE BEARINGS AND TRAILING ARM, NEVER CONNECT THE EARTH CONNECTOR TO THE AXLE HUB, WHEEL END OR TRAILING ARM!



12.8 Pedestals

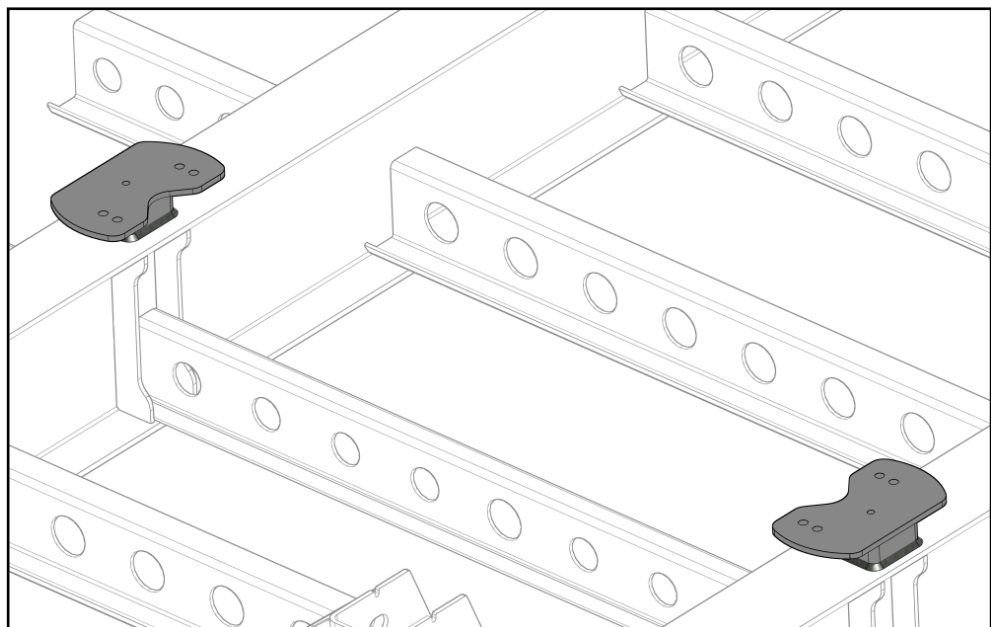
Weld the pedestals (if present in the suspension assembly) to the chassis according instructions.

The trailer builder is responsible that there are sufficient reinforcements in the vehicle chassis to guide the occurring forces on the pedestals.

See instructions: [Section 3.4](#)



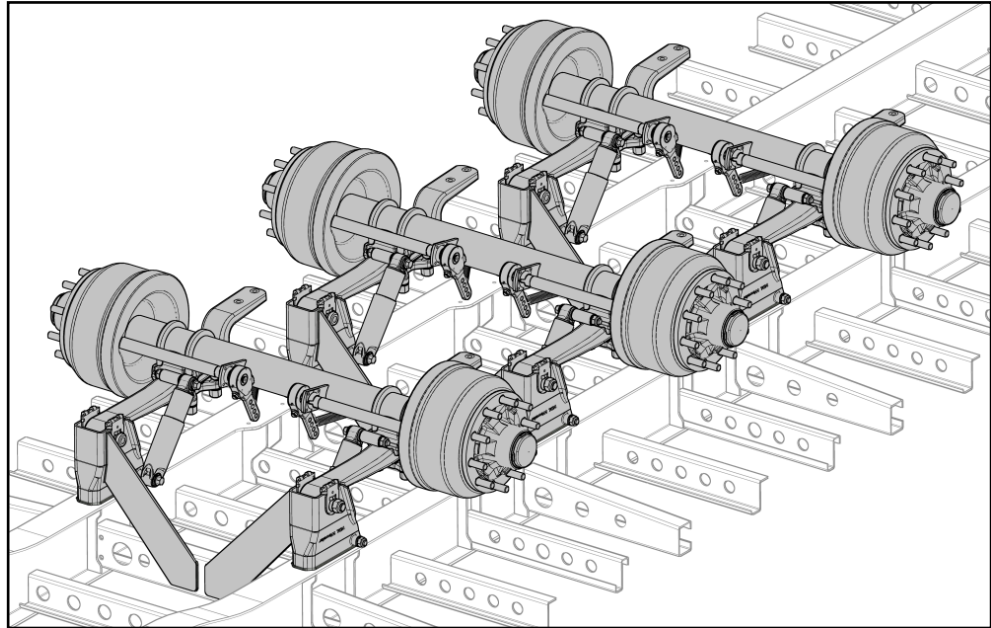
TO PREVENT DAMAGE TO THE BEARINGS AND TRAILING ARM, NEVER CONNECT THE EARTH CONNECTOR TO THE AXLE HUB, WHEEL END OR TRAILING ARM!



12. Final air suspension assembly I

12.9 Coating / painting

The complete chassis including suspension systems can be coated or painted. Before this point the air springs can also be mounted, but the rubber flexmember must be covered if this order of assembly is chosen.



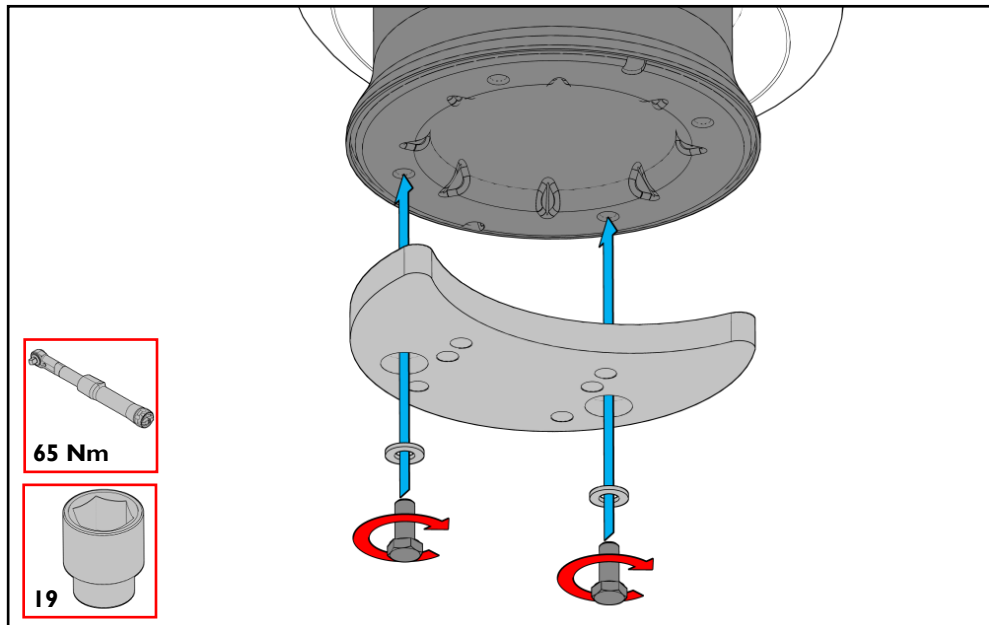
12.10a Air spring Ø350 Offset 30 or 50 or 95mm

First mount the Ø350 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according the instructions.

Follow the same steps for the other side.

See tightening instructions: Section 10

This installation guide shows the standard Ø350 air spring with 30-50-95 offset plate. Other available air spring (offset) options can be found in section 15.

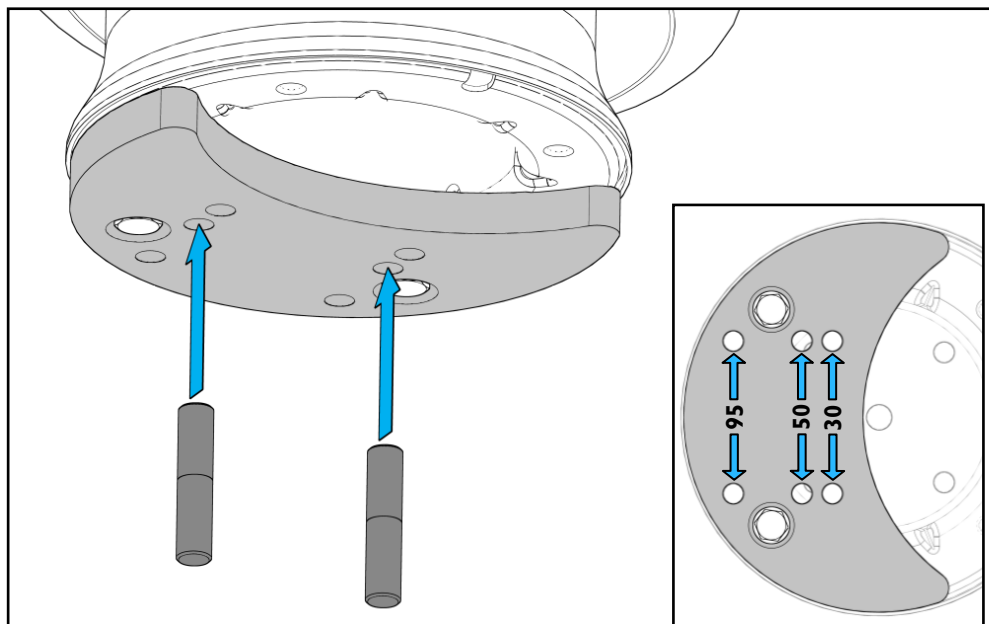


12.10b Air spring Ø350 Offset 30 or 50 or 95mm

Hand tighten the M16 studs in the air spring until it is fastened.

The support plate is suitable for multiple air spring offsets. Offset 30, 50 or 95mm. Choose the correct holes for the correct air spring offset (see application or system drawing).

Make sure the short threaded side goes in the support plate.

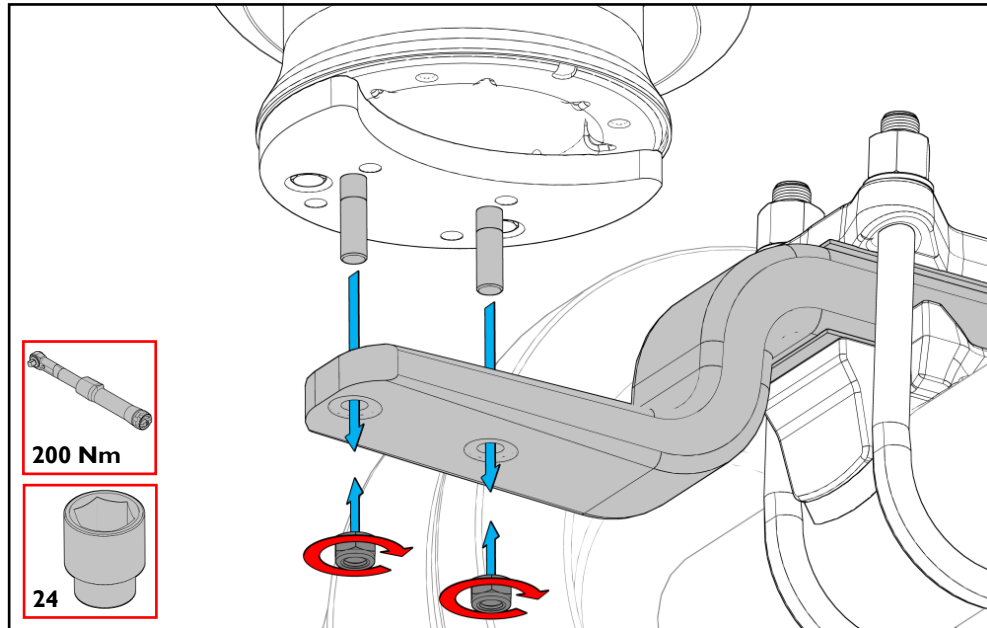


12. Final air suspension assembly I

12.10c Air spring Ø350 Offset 30 or 50 or 95mm

Finally mount the complete support plate with Ø350 air spring on the trailing arm. Tighten the locknuts to torque according the instructions.

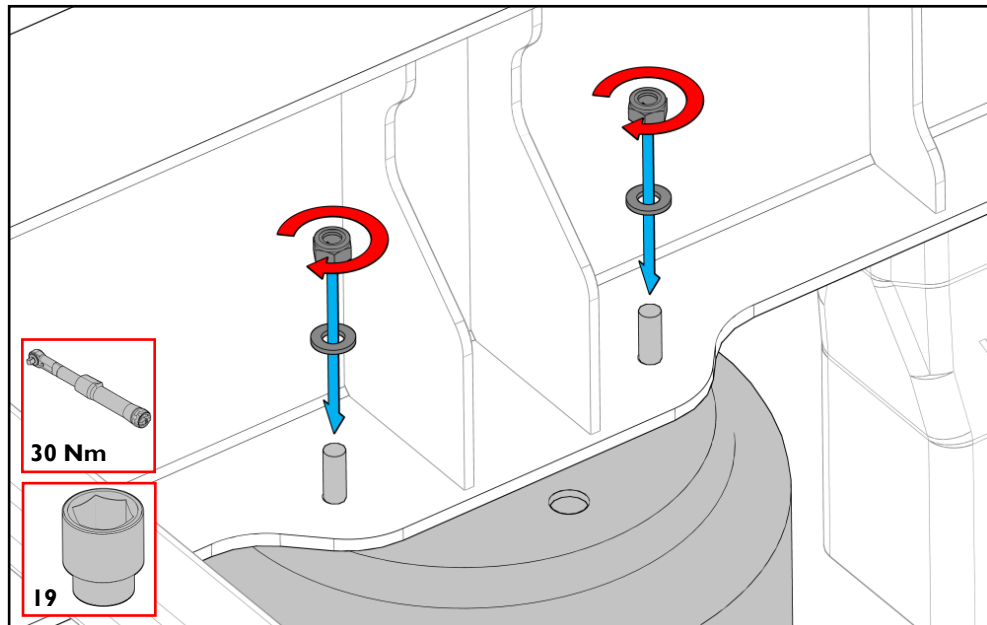
See tightening instructions: Section 10



12.11 Air spring to chassis / pedestal

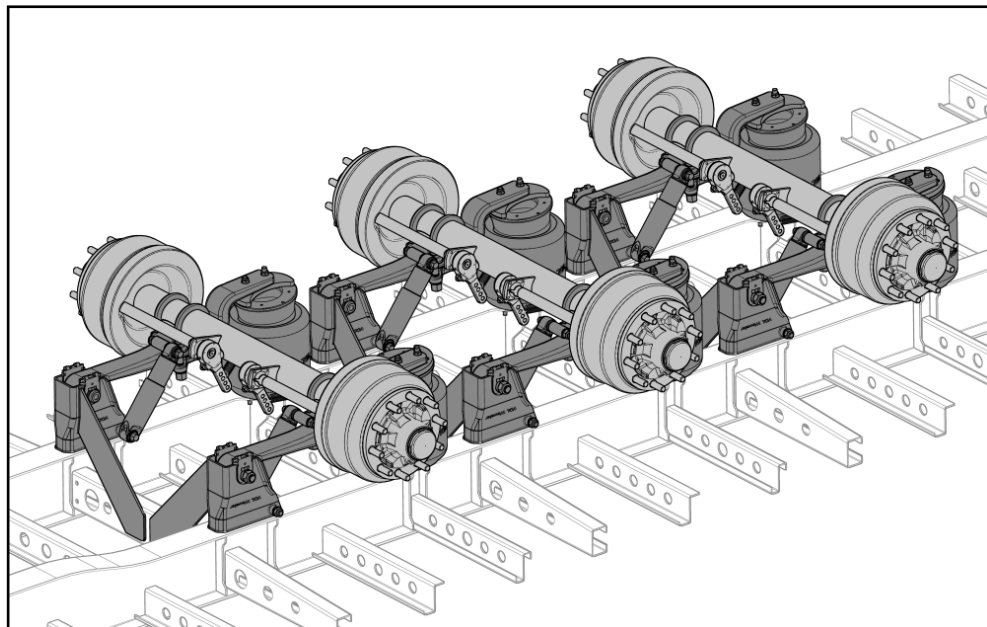
Mount the air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

See tightening instructions: Section 10



12.12 Complete assembly

System assembly complete. Ready for wheel mounting and air connections.



13. Final air suspension assembly 2

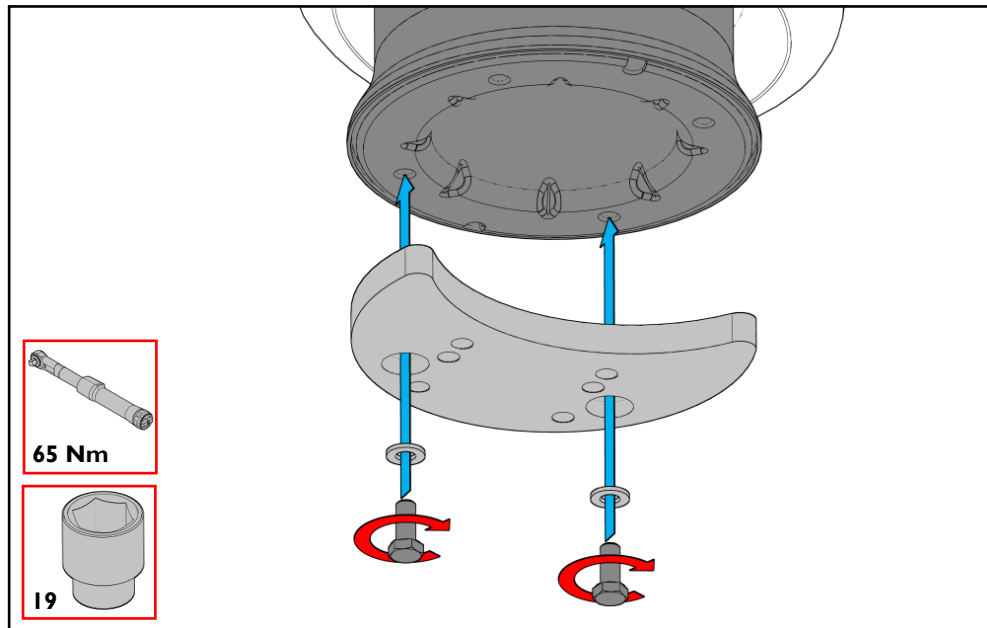
13.1a Air spring Ø350 Offset 30 or 50 or 95mm

First mount the Ø350 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according to the instructions.

Follow the same steps for the other side.

See tightening instructions: Section 10

This installation guide shows the standard Ø350 air spring with 30-50-95 offset plate. Other available air spring (offset) options can be found in section 15.



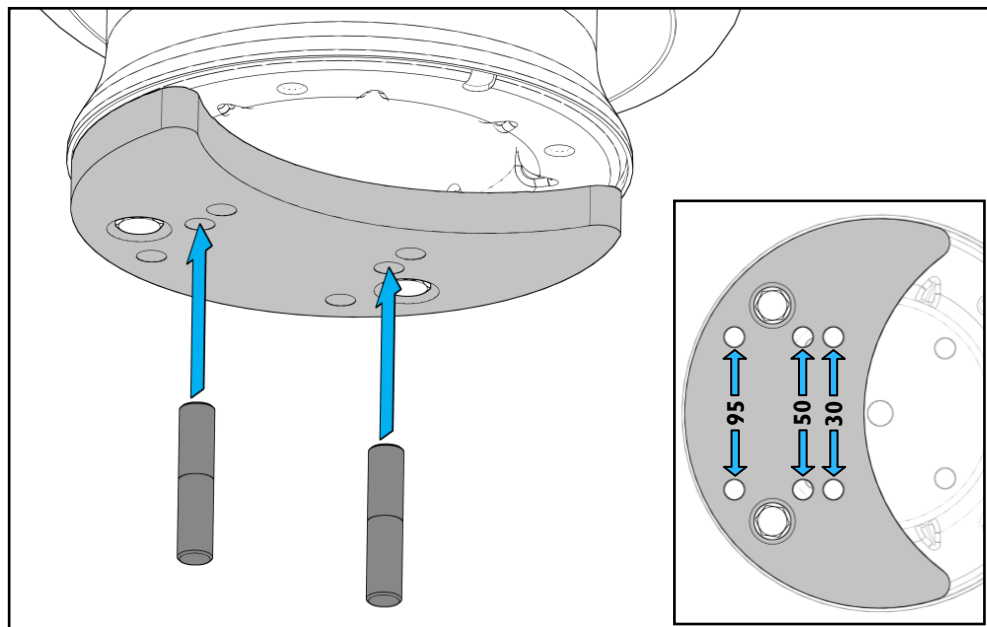
13.1b Air spring Ø350 Offset 30 or 50 or 95mm

Hand tighten the M16 studs in the air spring until it is fastened.

The support plate is suitable for multiple air spring offsets. Offset 30, 50 or 95mm. Choose the correct holes for the correct air spring offset (see application or system drawing).

Make sure the short threaded side goes in the support plate.

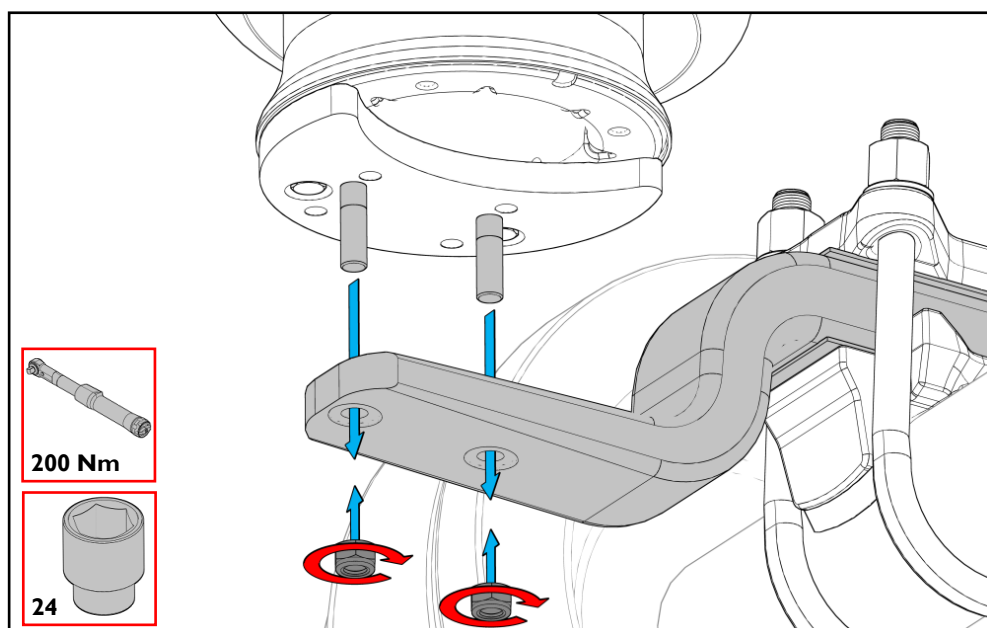
The illustration shows an assembly that creates an air spring offset of 50mm.



13.1c Air spring Ø350 Offset 30 or 50 or 95mm

Finally mount the complete support plate with Ø350 air spring on the trailing arm. Tighten the locknuts to torque according to the instructions.

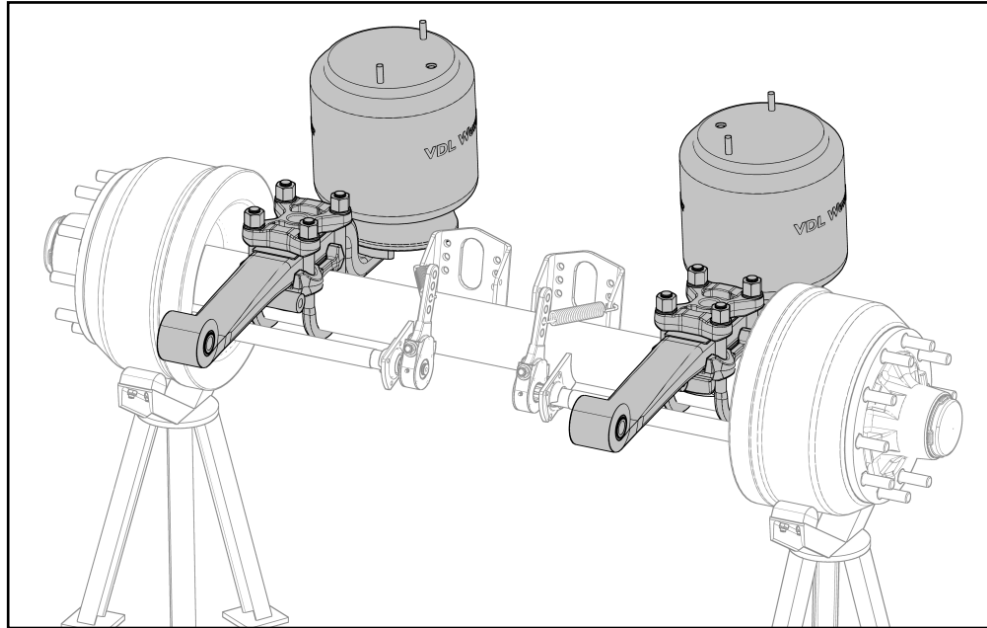
See tightening instructions: Section 10



13. Final air suspension assembly 2

13.2 Axle & suspension assembly

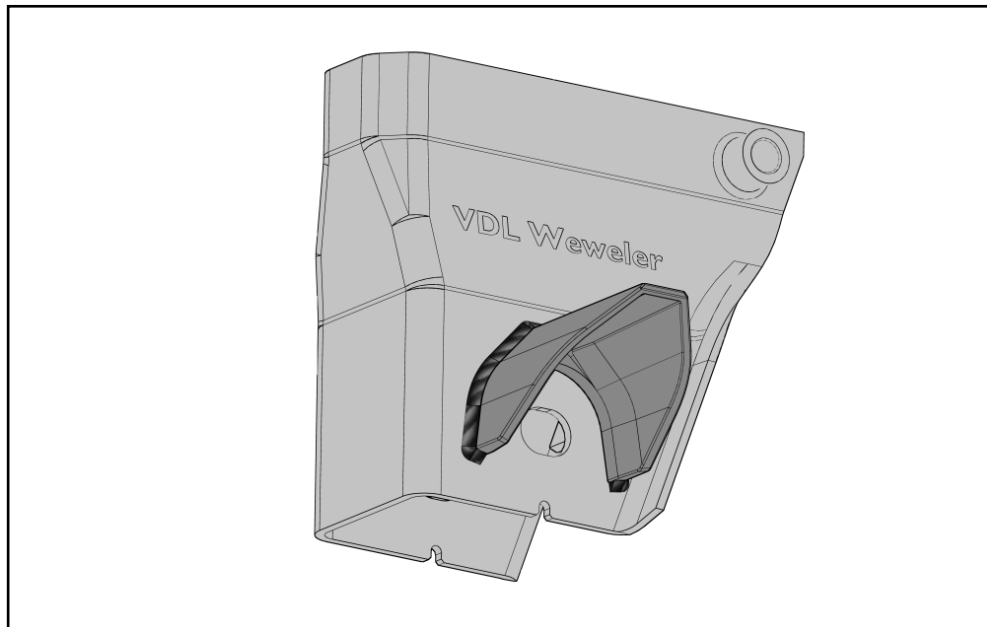
Air suspension sub-assembly on the axle complete and ready for mounting on the chassis.



13.3 Hanger bracket & casting

If an optional casted bracing is supplied. Weld the casted bracing part to the hanger bracket according instructions. Make per axle a lefthand and righthand version.

See instructions: Section 3.6



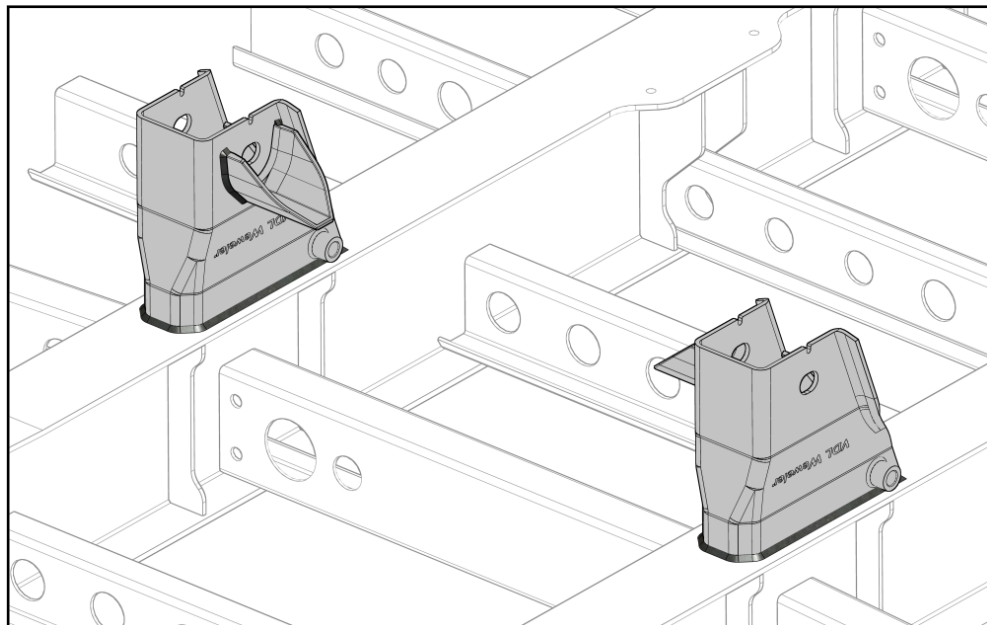
13.4 Hanger brackets

Align and weld the hanger brackets to the chassis rails according instructions at the correct spring track.

The trailer builder is responsible that there are sufficient reinforcements in the vehicle chassis to guide the occurring forces on the hanger brackets.

Illustration shows the hanger brackets with alignment option. The same instructions apply for the hanger brackets with welded fixed wear plates.

See instructions: Section 3.2 & 3.3



13. Final air suspension assembly 2

13.5 Bracing plates

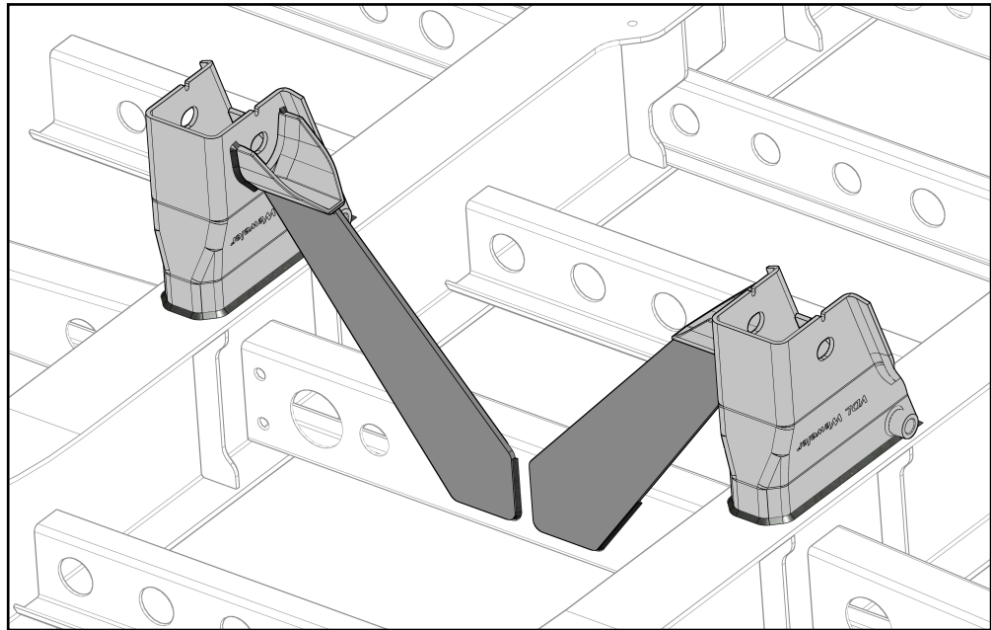
Weld the bracing plates to the casted bracing parts and the cross members in the chassis according instructions.

The plates must be straight and are not allowed to be bended.

See instructions: Section 3.6

For conventional plate bracing.

See instructions: Section 3.5

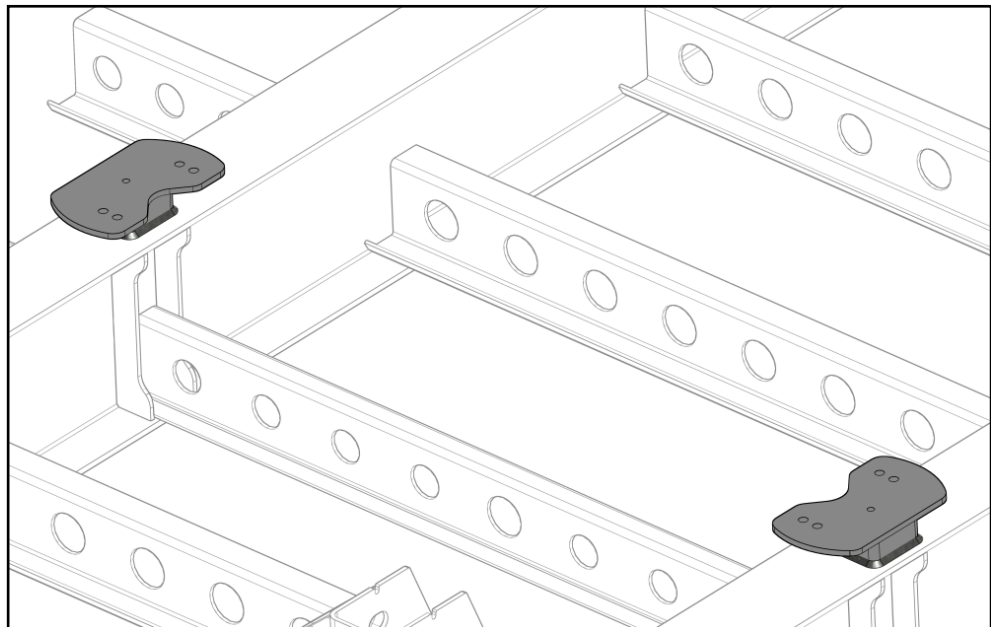


13.6 Pedestals

Weld the pedestals (if present in the suspension assembly) to the chassis according instructions.

The trailer builder is responsible that there are sufficient reinforcements in the vehicle chassis to guide the occuring forces on the pedestals.

See instructions: Section 3.4

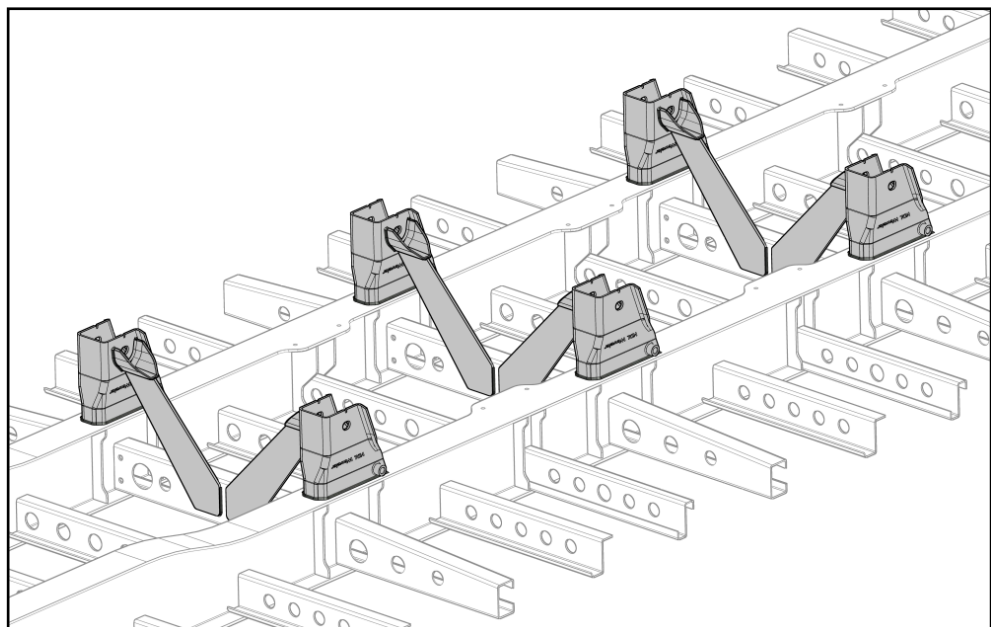


13.7 Coating / painting

The complete chassis can be painted/coated before mounting the assembled suspension.

See instructions for areas which must be free from paint/coating or can only be primed.

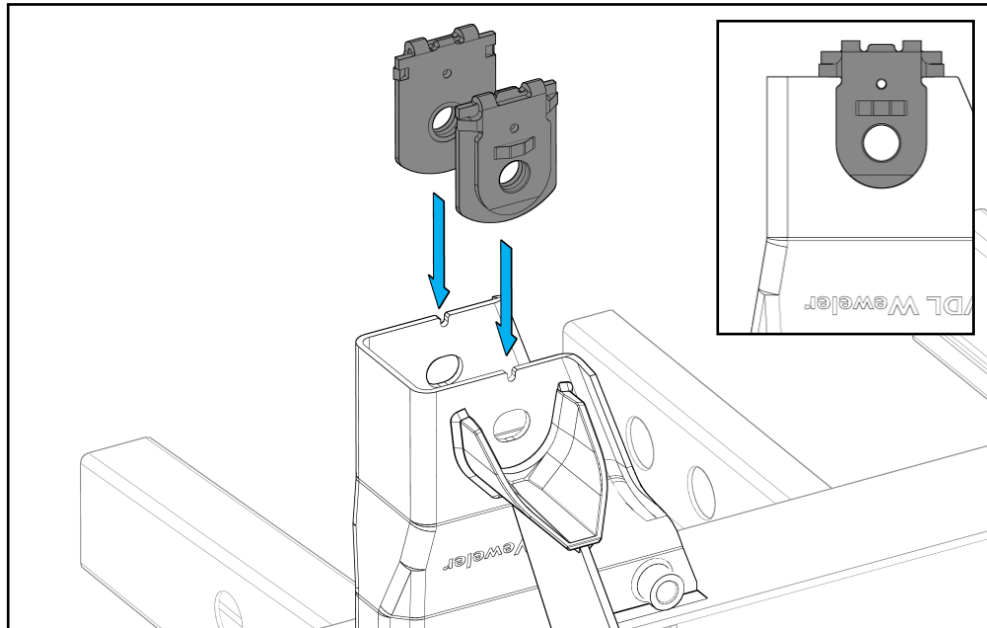
See instructions: Section 8



13. Final air suspension assembly 2

13.8 Wear/alignment plates

In case of alignment in the hanger bracket. Place the wear/alignment plates over the bottom edges of the hanger brackets.

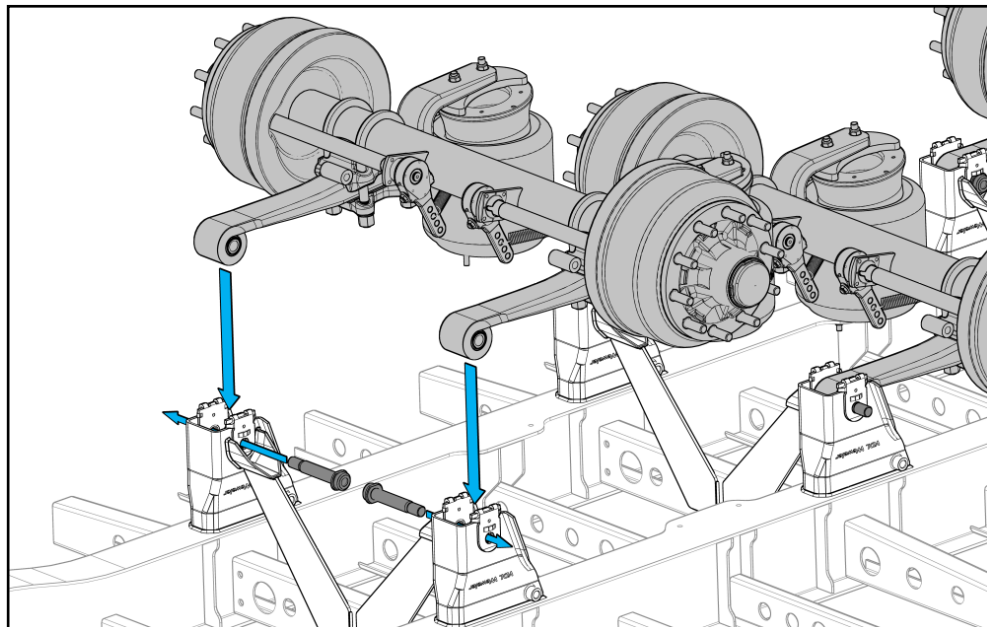


13.9 Axle placement

Place the assembled axles in the hanger brackets between the wear plates and place the pivot bolts.

Make sure all the axles are secured on the required **ride height** using axle supports or blocks under the suspension system.

After alignment (step 13.16) the connection can be torqued.



13.10 Axle alignment

Align all axles (disc or drum) within the tolerances given, taken the second axle as a reference. A through F are the axle centres. The same tolerances apply for alignment using a laser.

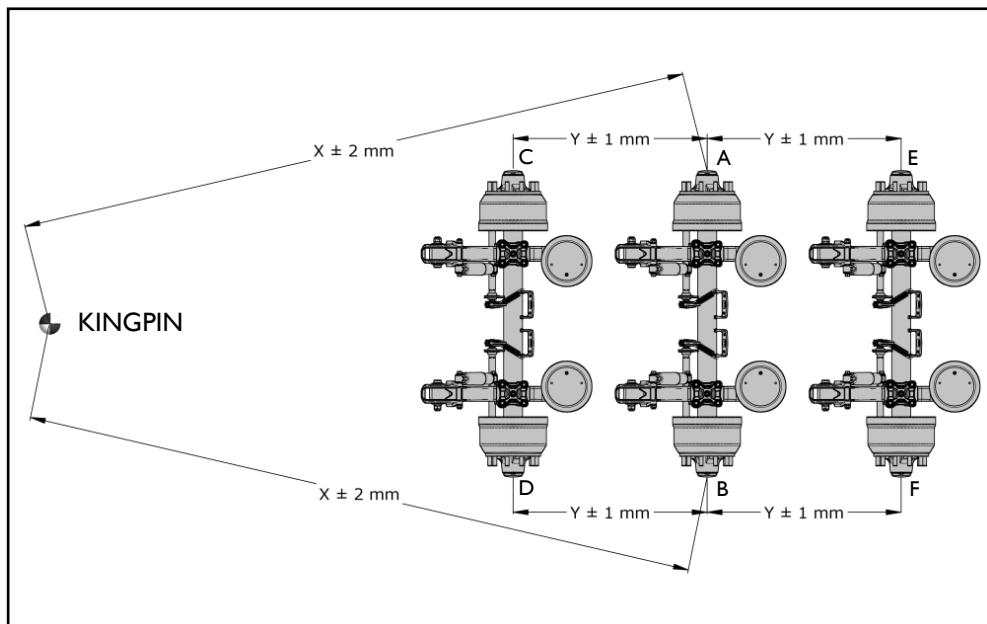
See instructions: Section 7.3

In case of hanger brackets with alignment option follow instructions for adjusting the alignment in the hanger bracket.

See instructions: Section 7.4 or 7.5

In case of hanger brackets with welded fixed wear plates follow instructions for adjusting the alignment in the axle clamping.

See instructions: Section 7.6

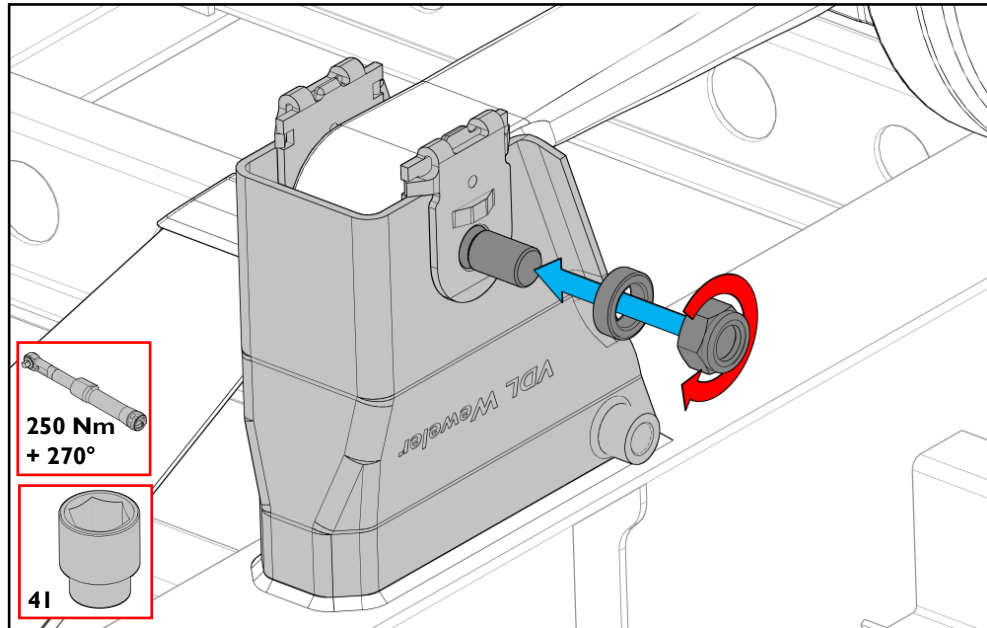


13. Final air suspension assembly 2

13.11 Pivot bolt connection

Apply grease on ¼ of the thread surface.
Place the spacers and nuts.
Tighten the pivot bolt connection **at ride height** according instructions to torque.
Repeat the same procedure for the other side.

See tightening instructions: Section 10



13.12 Welding wear plates

In case of hanger brackets with alignment option the wear plates must be welded to the hanger bracket after system alignment for the following bracing / system configurations:

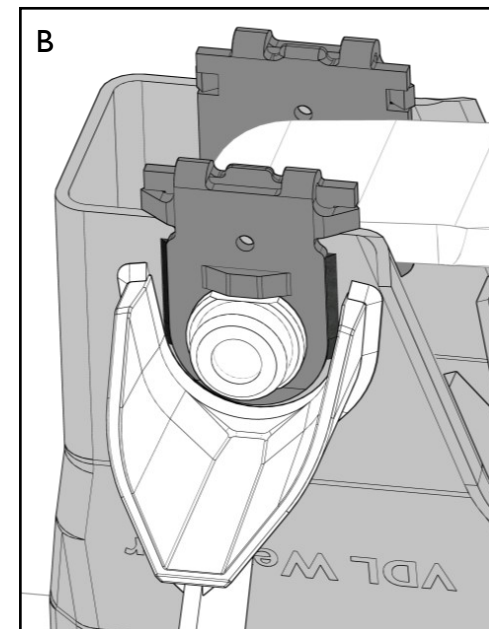
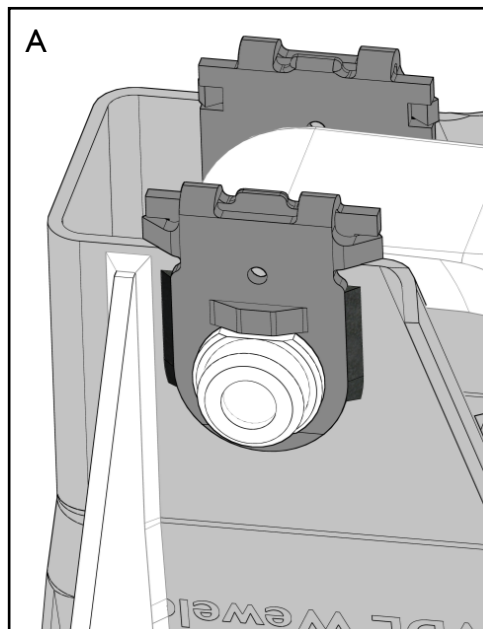
- A. Conventional plate bracing and an axle load **over 9t.**
- B. Bolt-on / Welded casted bracing and an axle load **over 10t.**

Paint welded area afterwards in order to protect from oxidation.

See instructions: Section 3.7



TO PREVENT DAMAGE TO THE BEARINGS AND TRAILING ARM, NEVER CONNECT THE EARTH CONNECTOR TO THE AXLE HUB, WHEEL END OR TRAILING ARM!

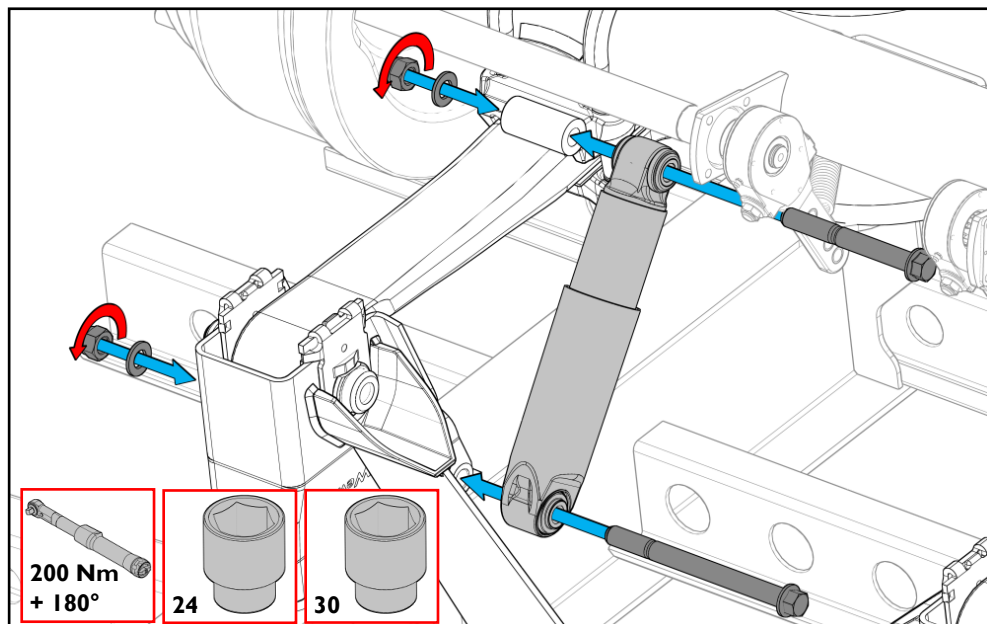


13.13 Shock absorbers (side mounted)

Place the shock absorbers, bolts, nuts and washers. If present, follow the instructions on the shock absorber (see Section 6).

Tighten the top and bottom connection **at ride height** to torque according the instructions.

See tightening instructions: Section 10

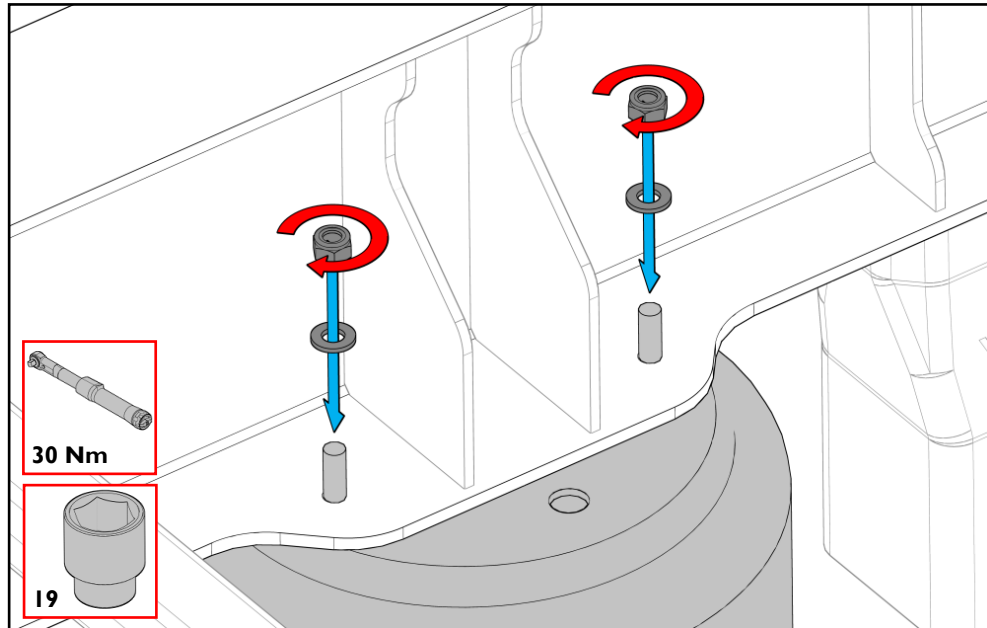


13. Final air suspension assembly 2

13.14 Air spring to chassis / pedestal

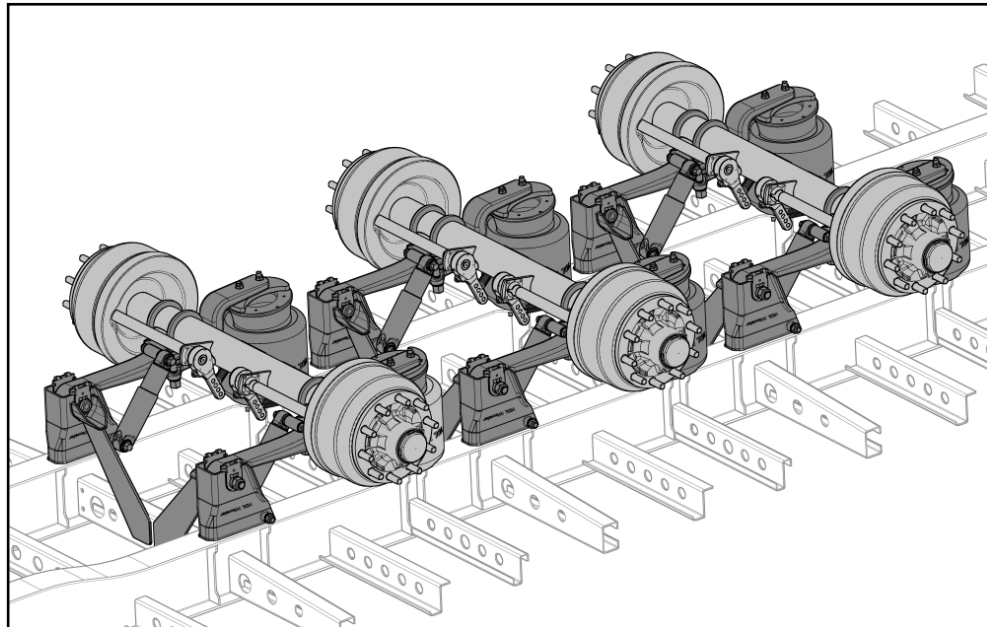
Mount the air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

See tightening instructions: *Section 10*



13.15 Complete assembly

System assembly complete. Ready for wheel mounting and air connections.



14. Available axle clampings

14.1 Standard axle seat $\varnothing 127 / \varnothing 146$ Underslung application M22 U-Bolts Front mounted shock absorbers

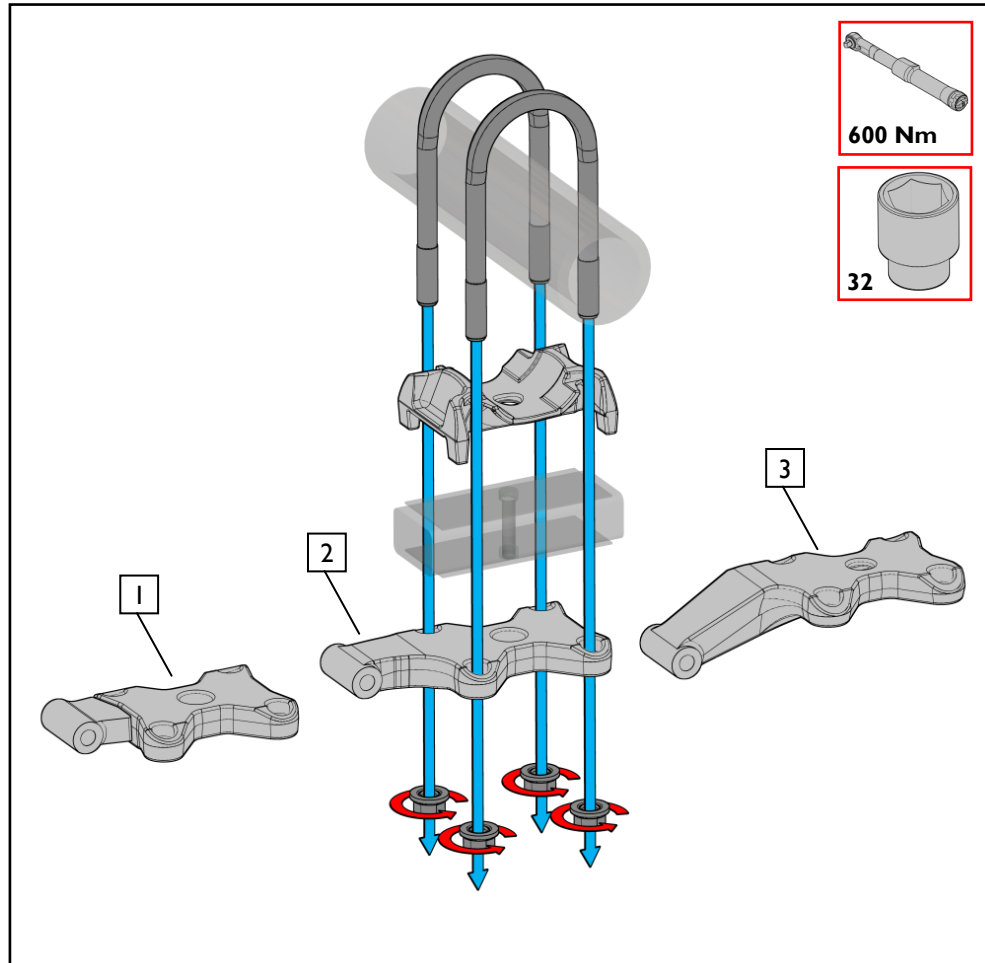
U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

The U-bolt plate type 2 is not available for $\varnothing 146$.

See welding instructions: Section 4.1

See tightening instructions: Section 10



14.2 Standard axle seat $\varnothing 127 / \varnothing 146$ Underslung application M24 U-Bolts Front mounted shock absorbers

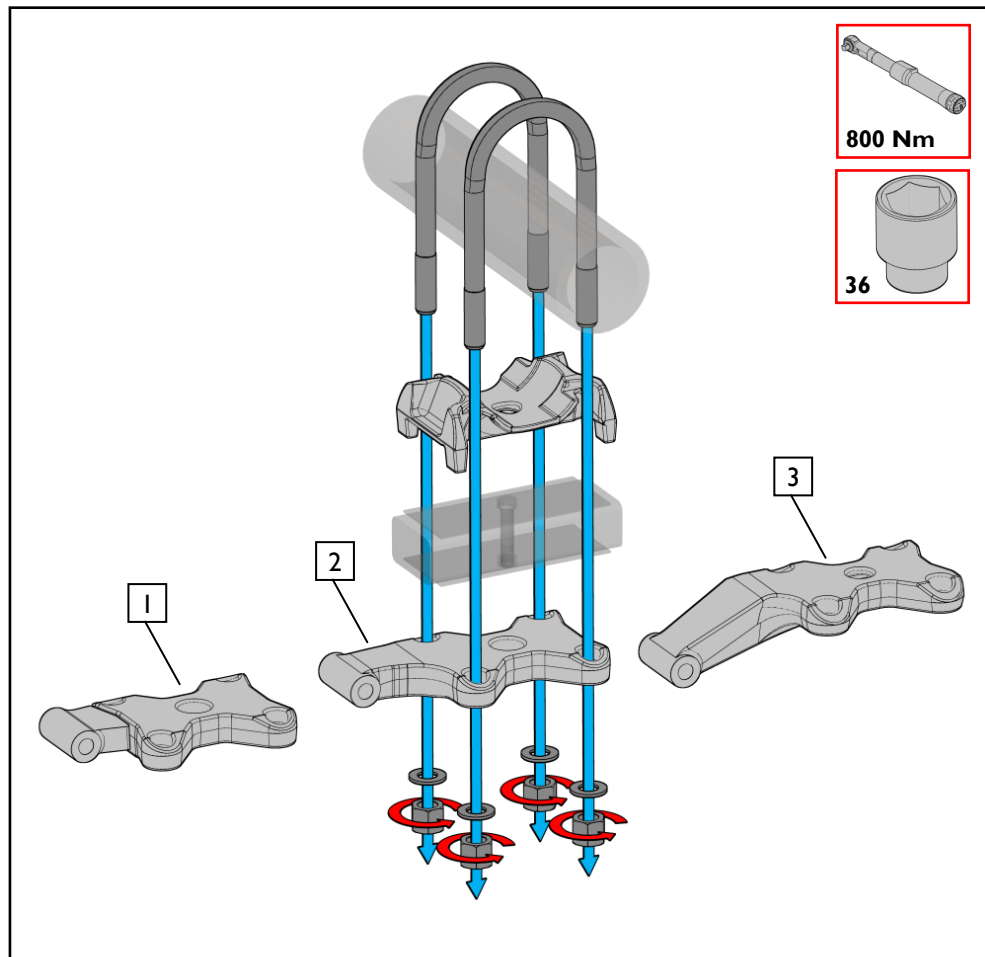
U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

The U-bolt plate type 2 is not available for $\varnothing 146$.

See welding instructions: Section 4.1

See tightening instructions: Section 10



14. Available axle clampings

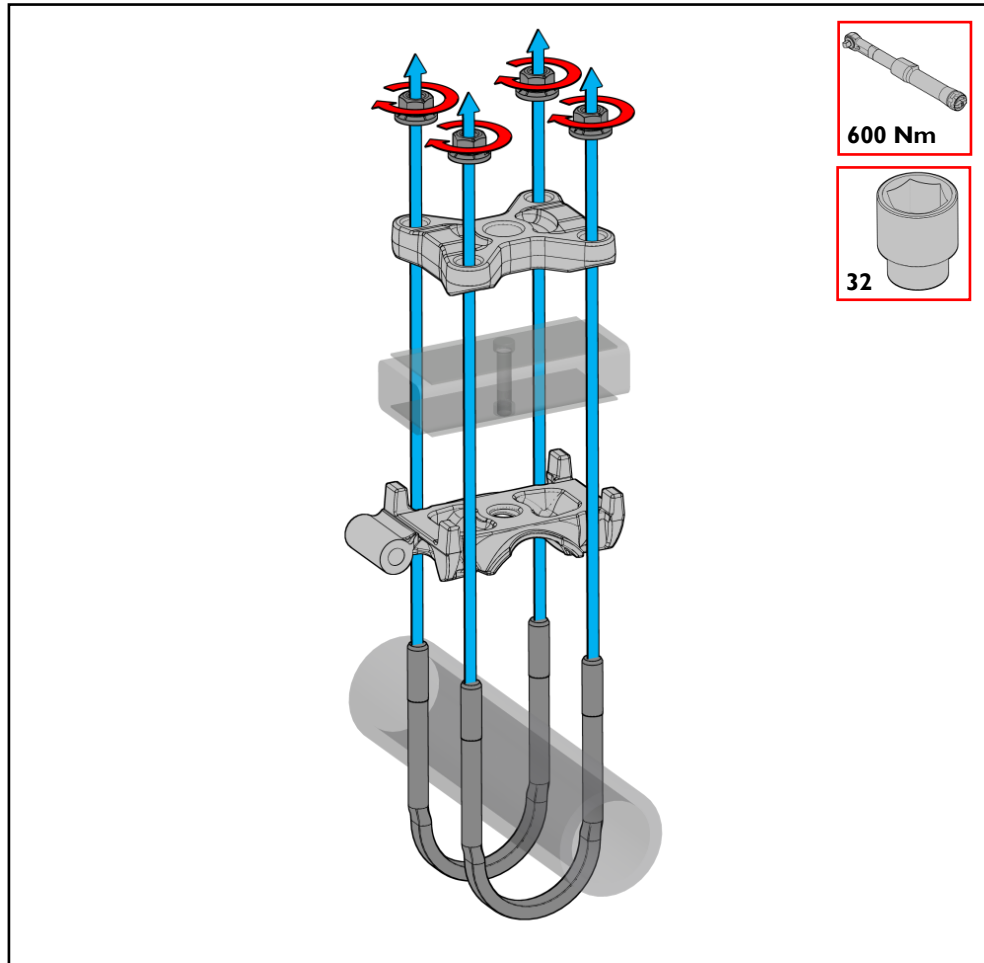
14.3 Standard axle seat $\varnothing 127 / \varnothing 146$ Overslung application M22 U-Bolts Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.1

See tightening instructions: Section 10



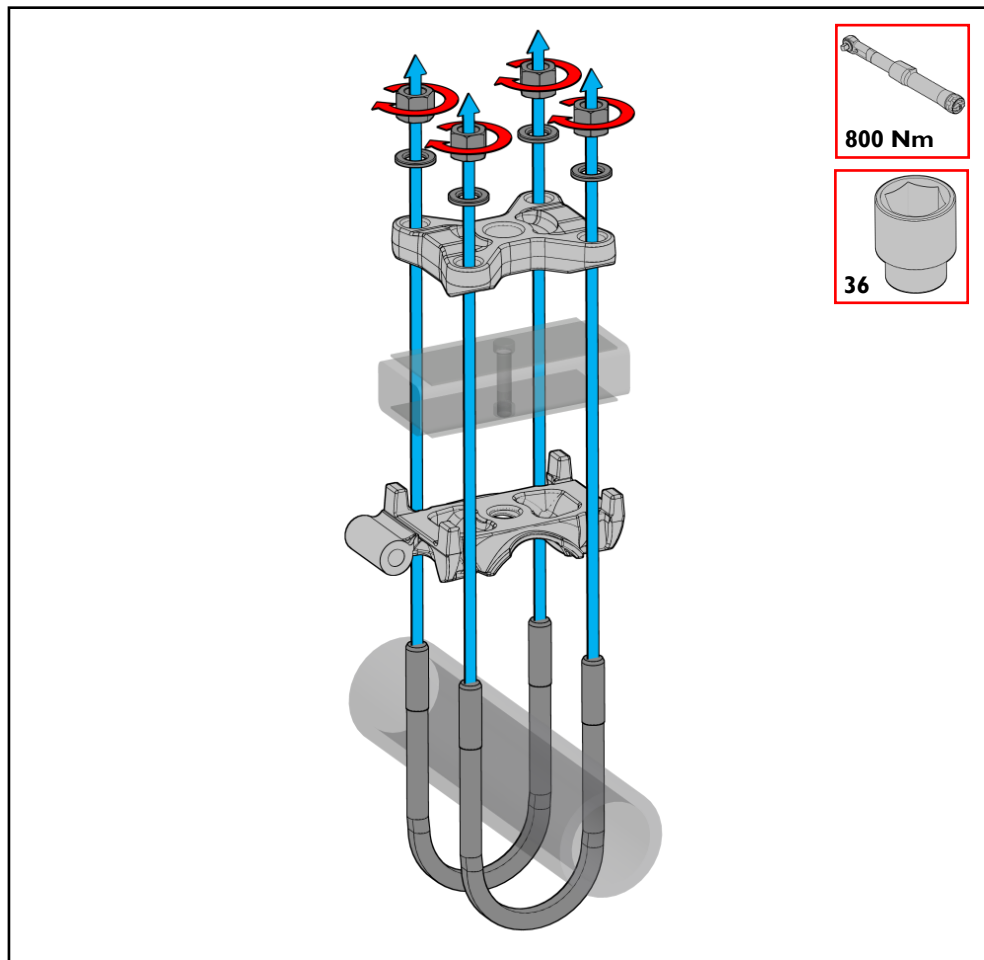
14.4 Standard axle seat $\varnothing 127 / \varnothing 146$ Overslung application M24 U-Bolts Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.1

See tightening instructions: Section 10



14. Available axle clampings

14.5 HD axle seat Ø127 / Ø146

Underslung application

M24 U-Bolts

Front mounted shock absorbers

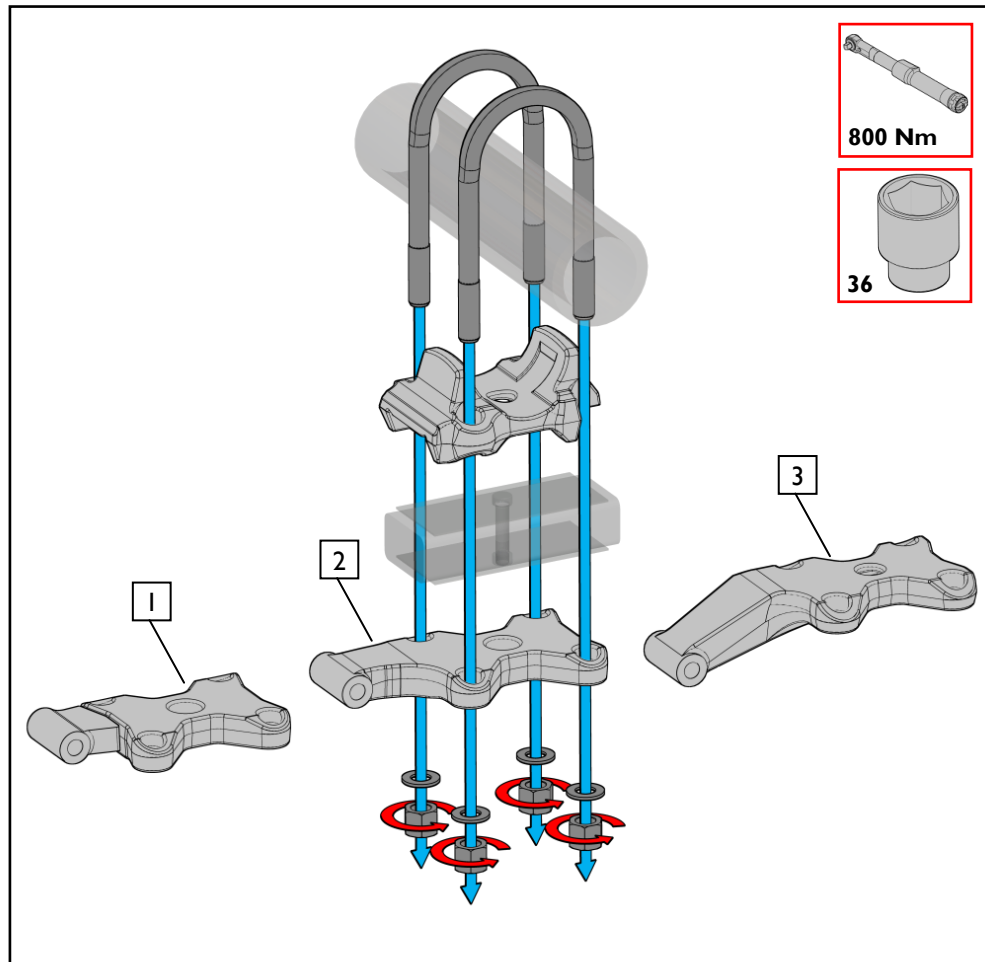
U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

The U-bolt plate type 2 is not available for Ø146.

See welding instructions: Section 4.2

See tightening instructions: Section 10



14.6 HD axle seat Ø127 / Ø146

Overslung application

M24 U-Bolts

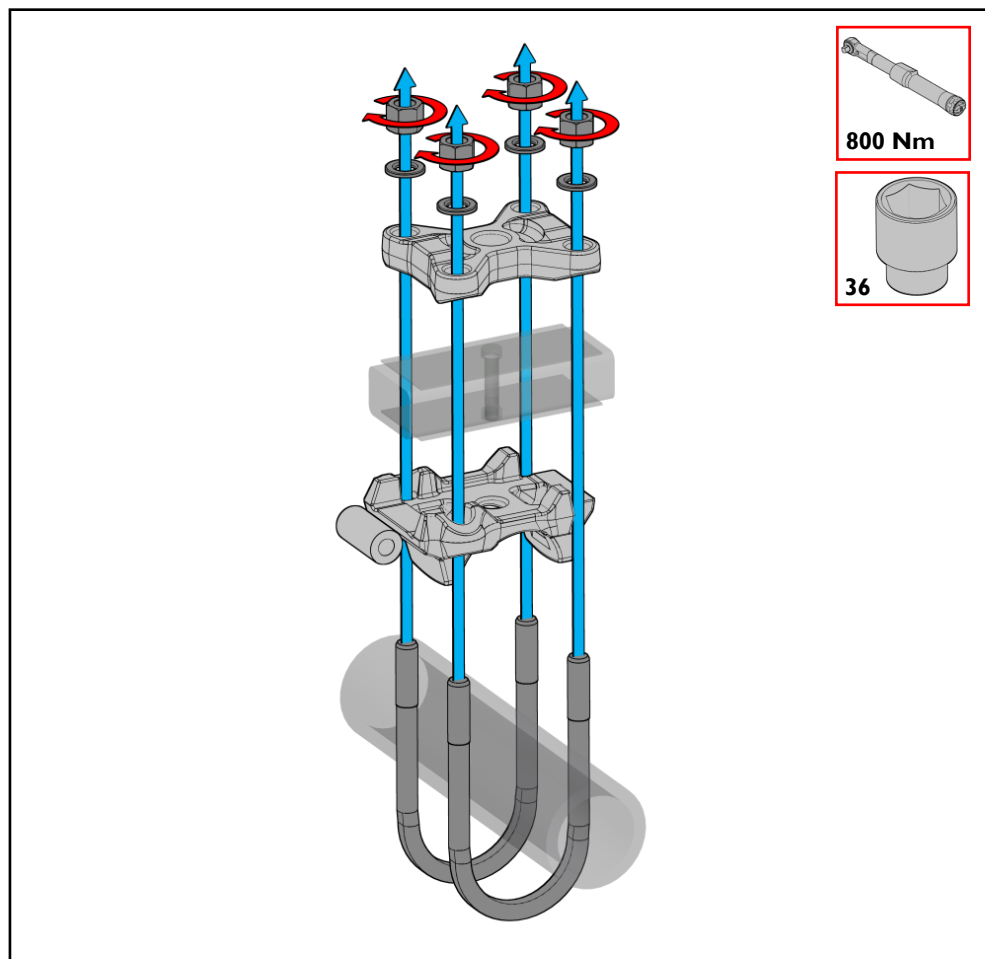
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.2

See tightening instructions: Section 10



14. Available axle clampings

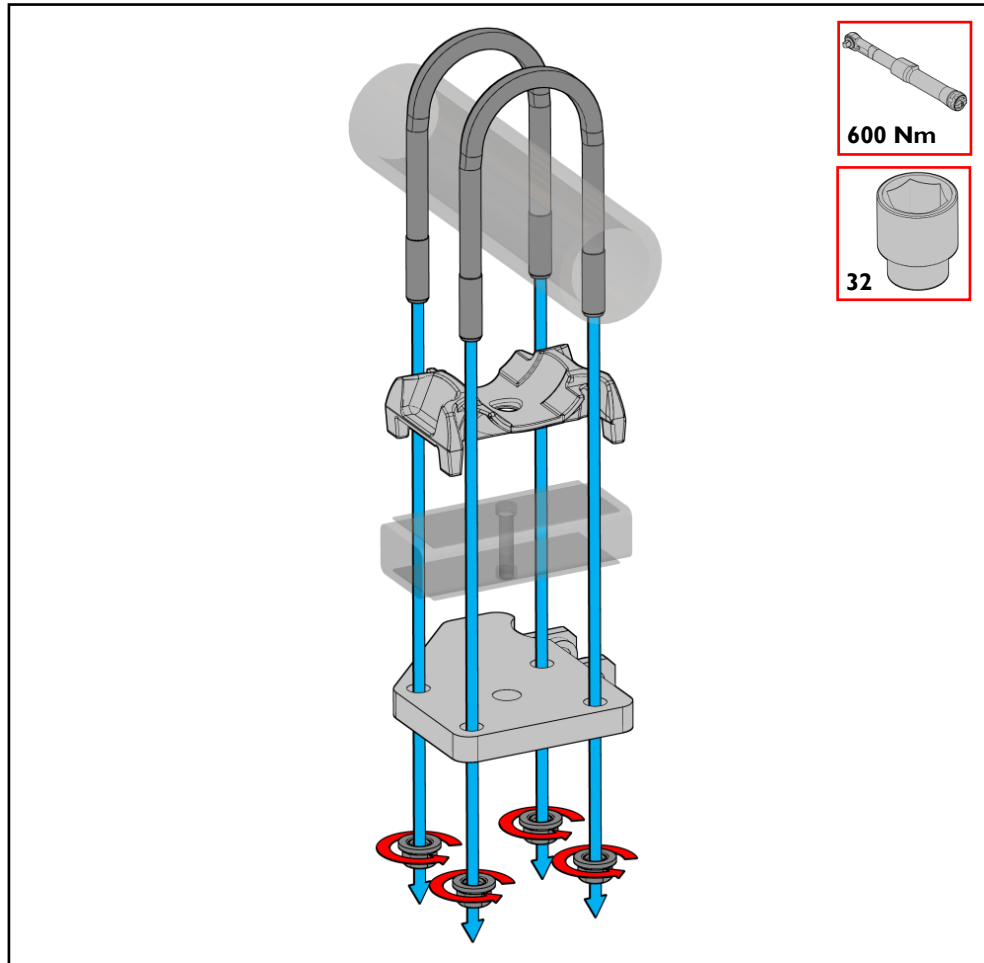
14.7 Standard axle seat $\varnothing 127 / \varnothing 146$ Underslung application M22 U-Bolts Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.1

See tightening instructions: Section 10



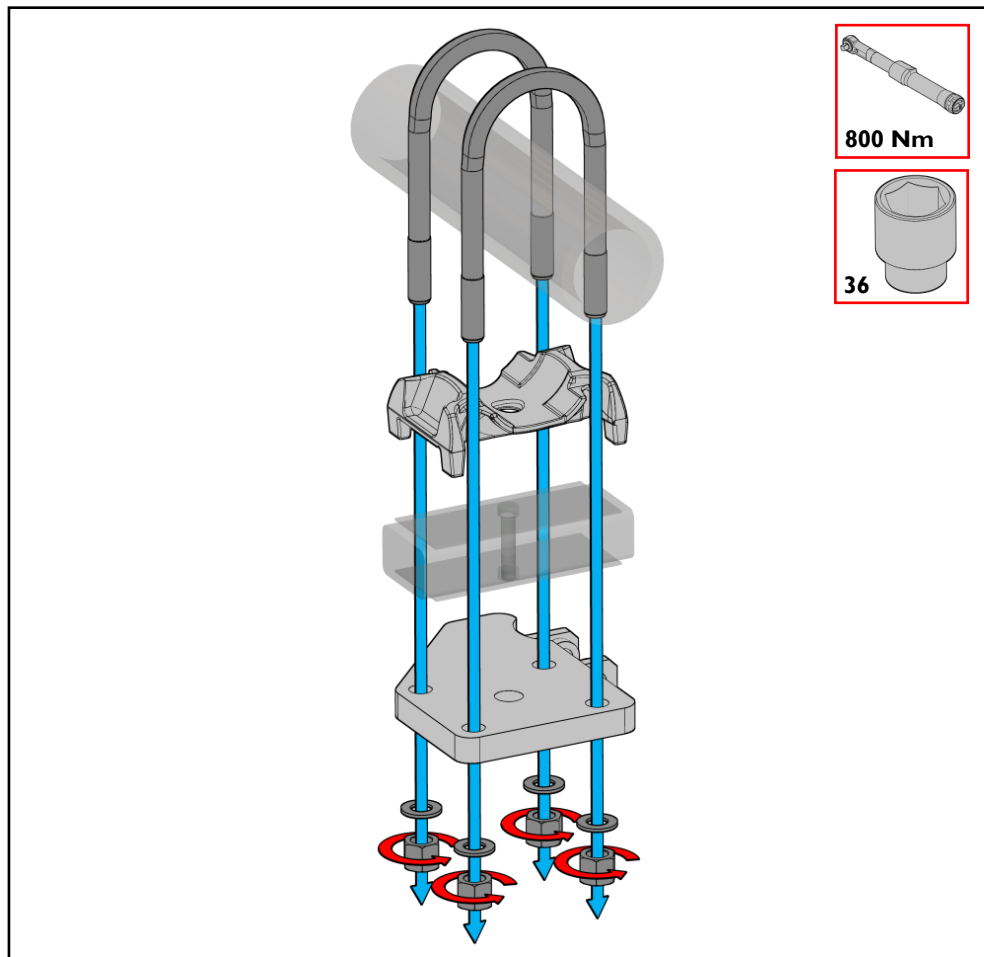
14.8 Standard axle seat $\varnothing 127 / \varnothing 146$ Underslung application M24 U-Bolts Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.1

See tightening instructions: Section 10



14. Available axle clampings

14.9 HD axle seat $\varnothing 127 / \varnothing 146$

Underslung application

M24 U-Bolts

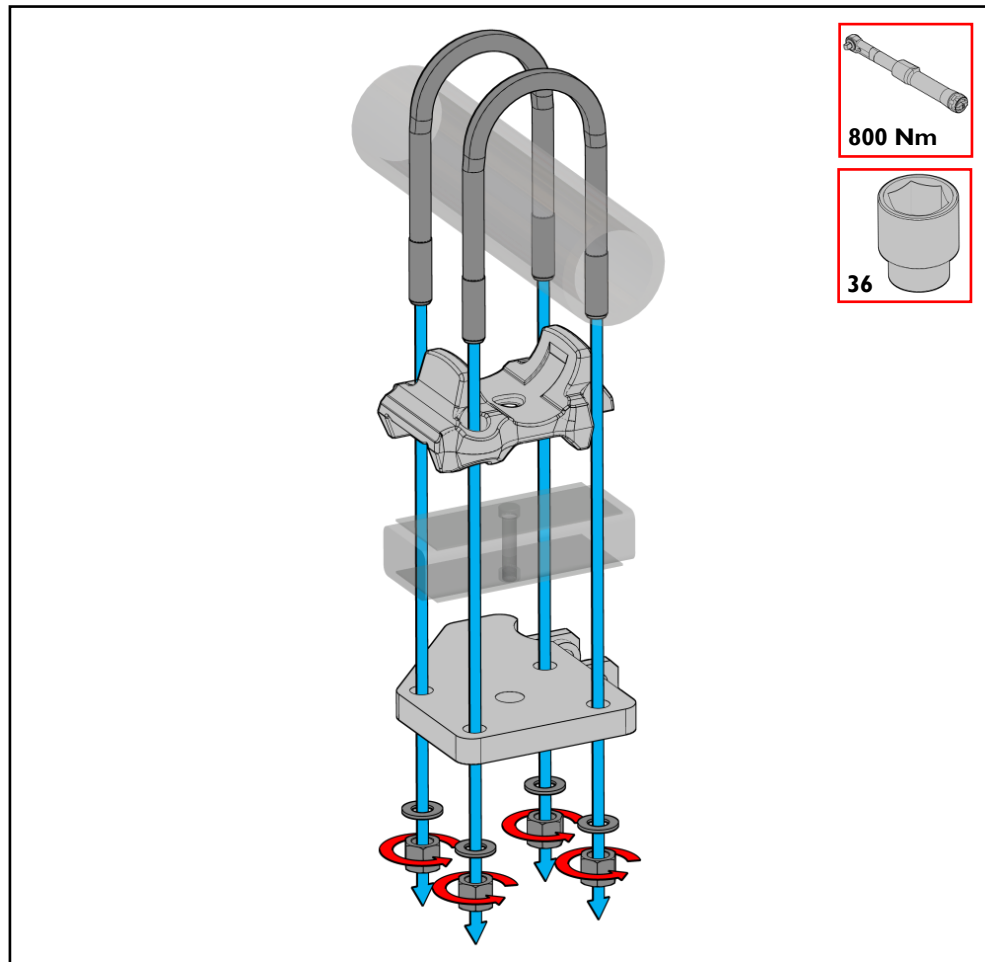
Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.2

See tightening instructions: Section 10



14. Available axle clampings

14.10 Axle seat □I20

Underslung application

M22 U-Bolts

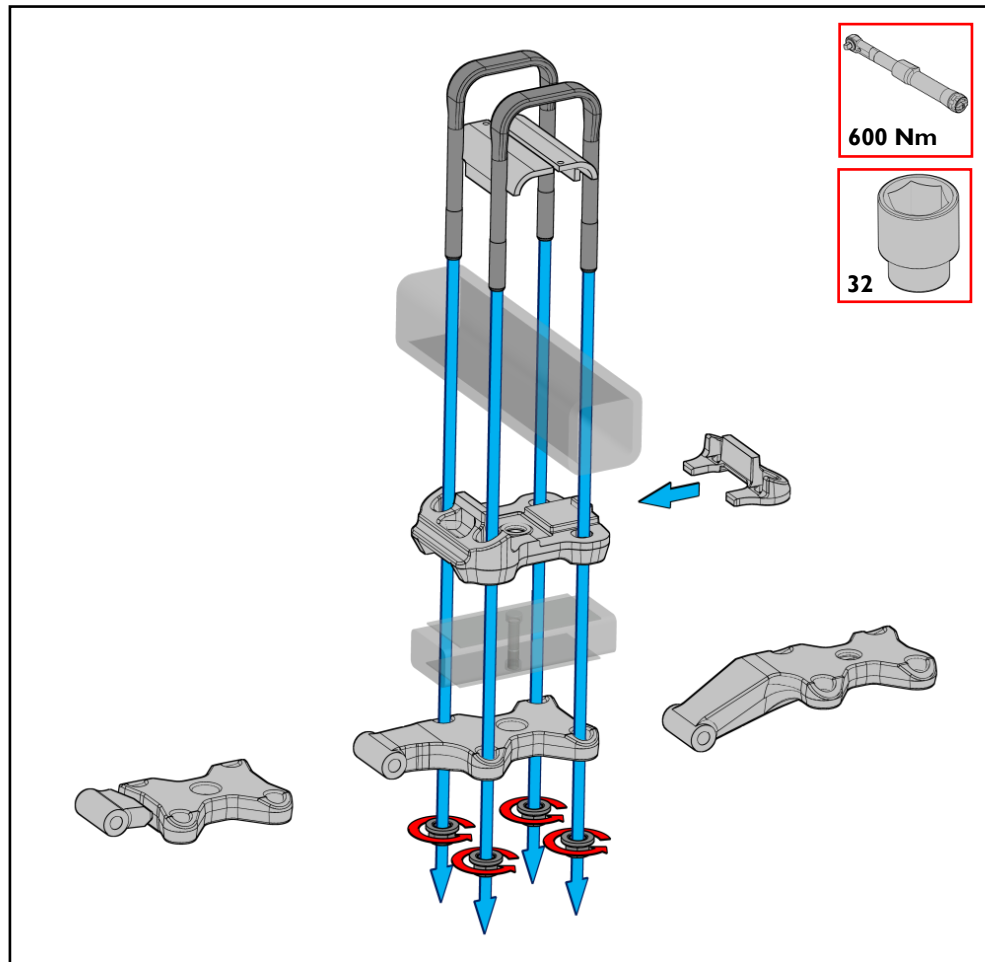
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14.11 Axle seat □I20

Underslung application

M24 U-Bolts

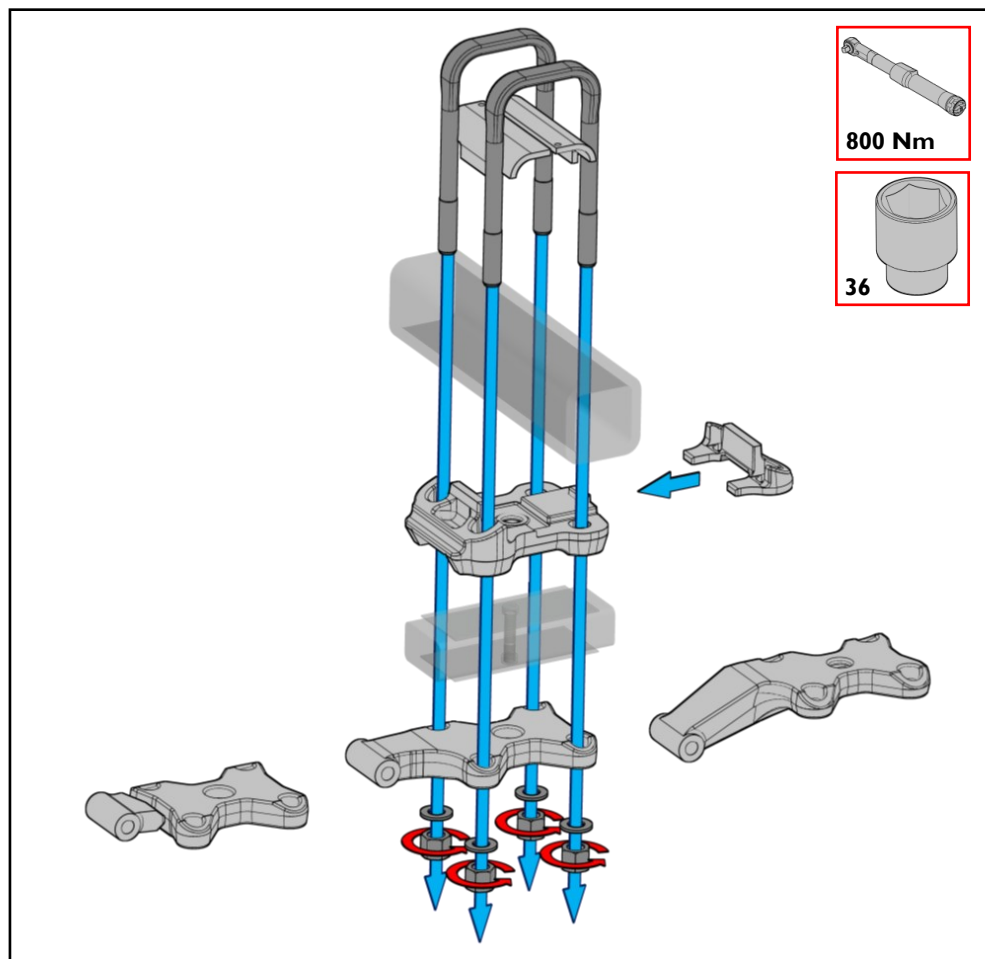
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14. Available axle clampings

14.12 Axle seat □I20

Overslung application

M22 U-Bolts

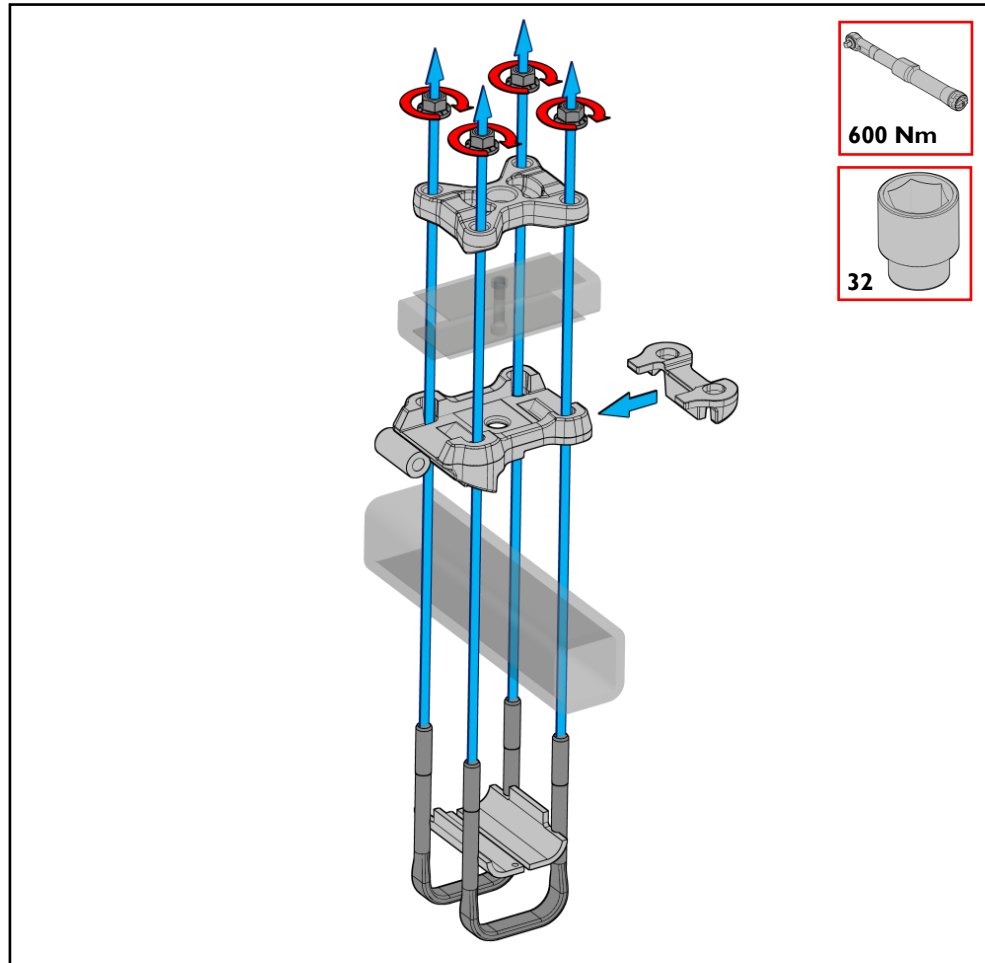
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14.13 Axle seat □I20

Overslung application

M24 U-Bolts

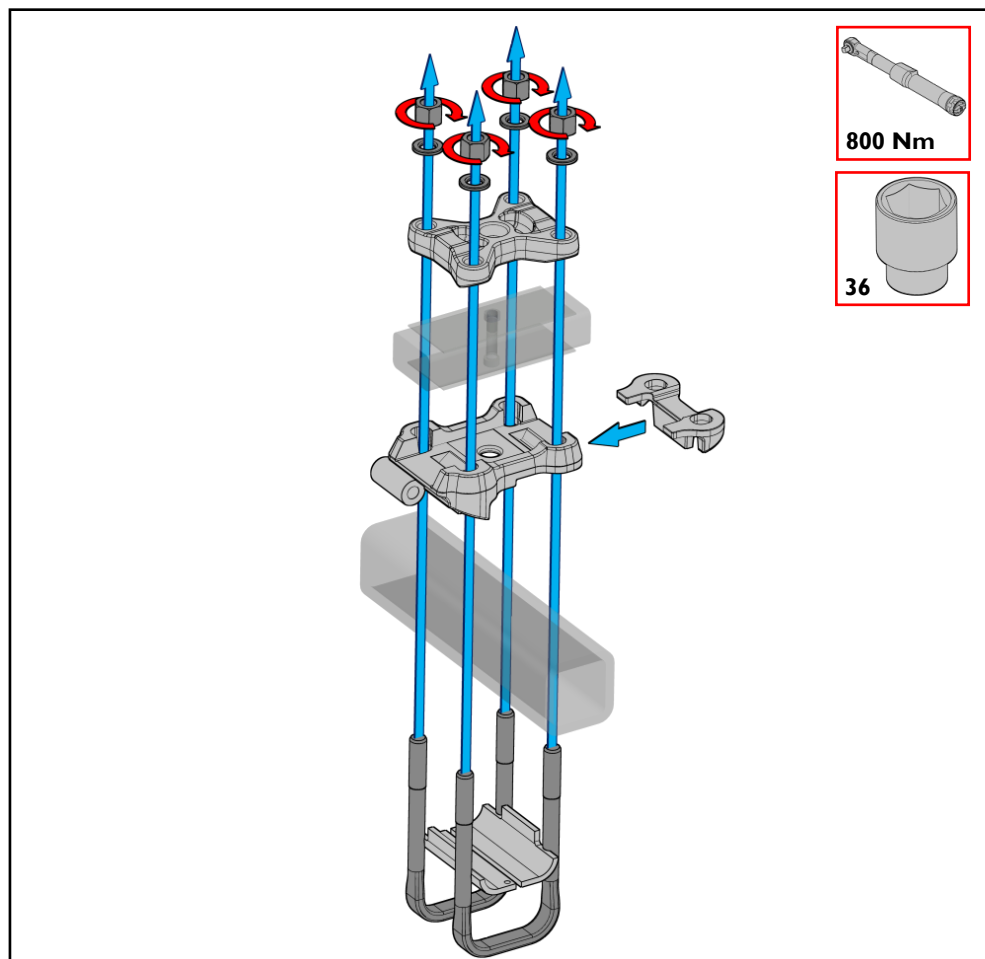
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14. Available axle clampings

14.14 Axle seat □I20

Underslung application

M22 U-Bolts

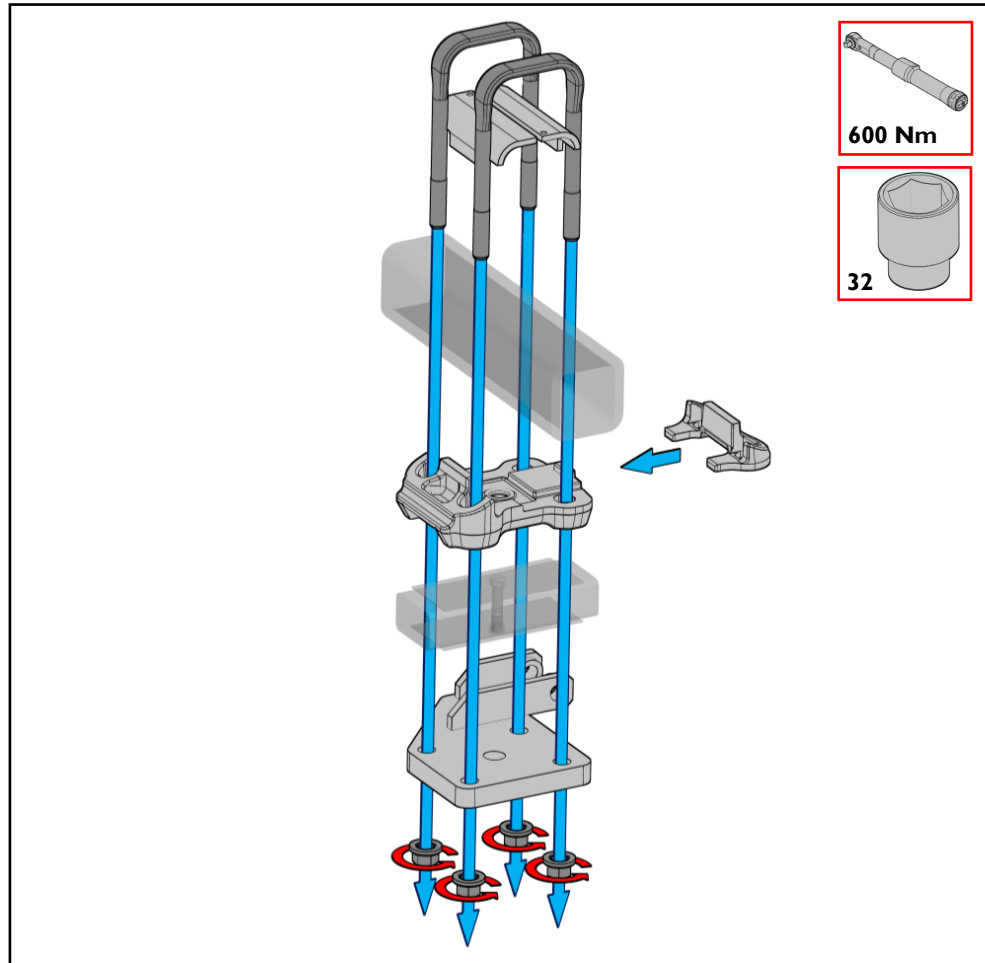
Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14.15 Axle seat □I20

Underslung application

M24 U-Bolts

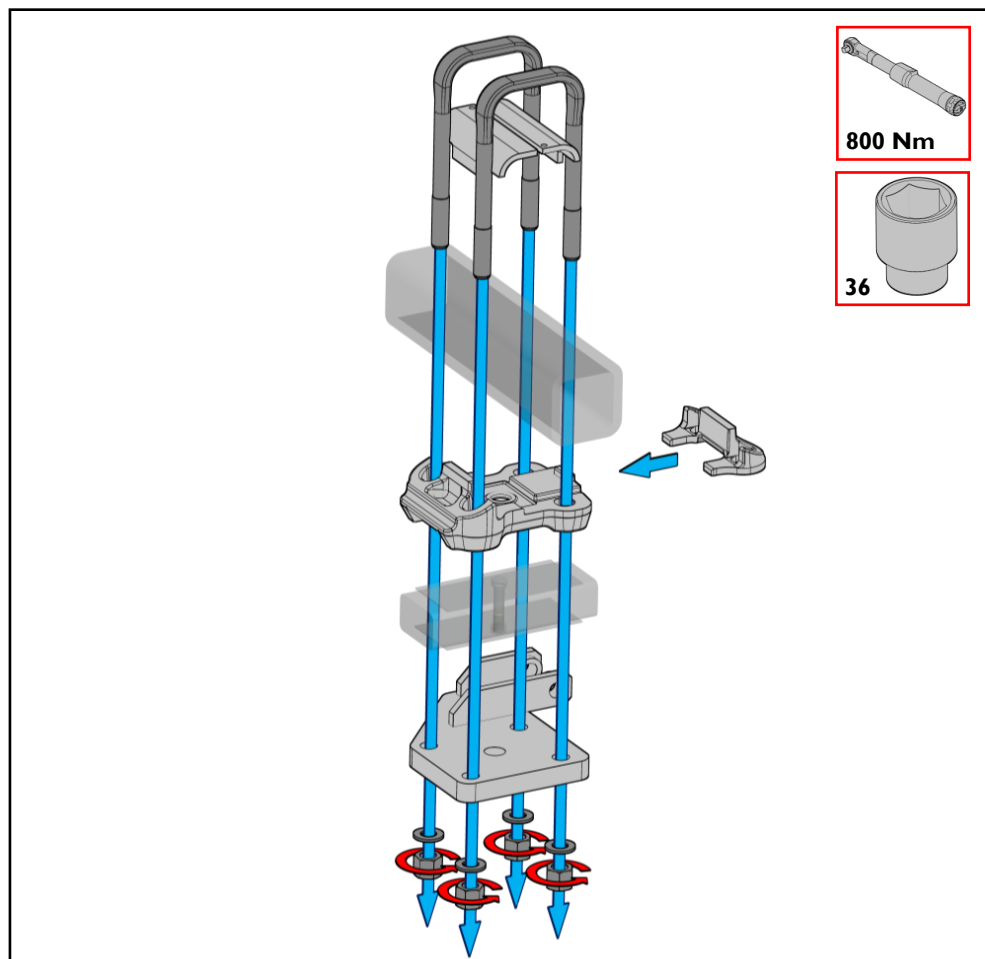
Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.3

See tightening instructions: Section 10



14. Available axle clampings

14.16 Axle seat □I50 (Type 7)

Underslung application

M24 Bolts

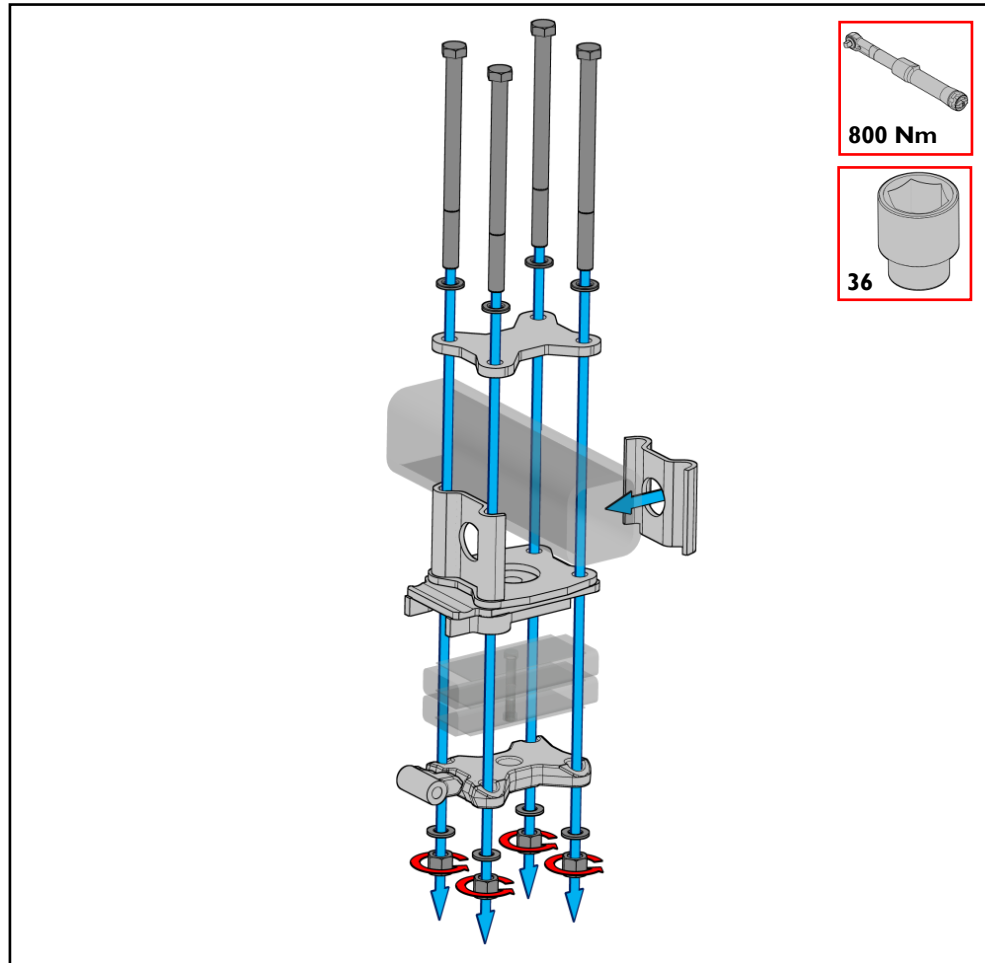
Front mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14.17 Axle seat □I50 (Type 7)

Overslung application

M24 Bolts

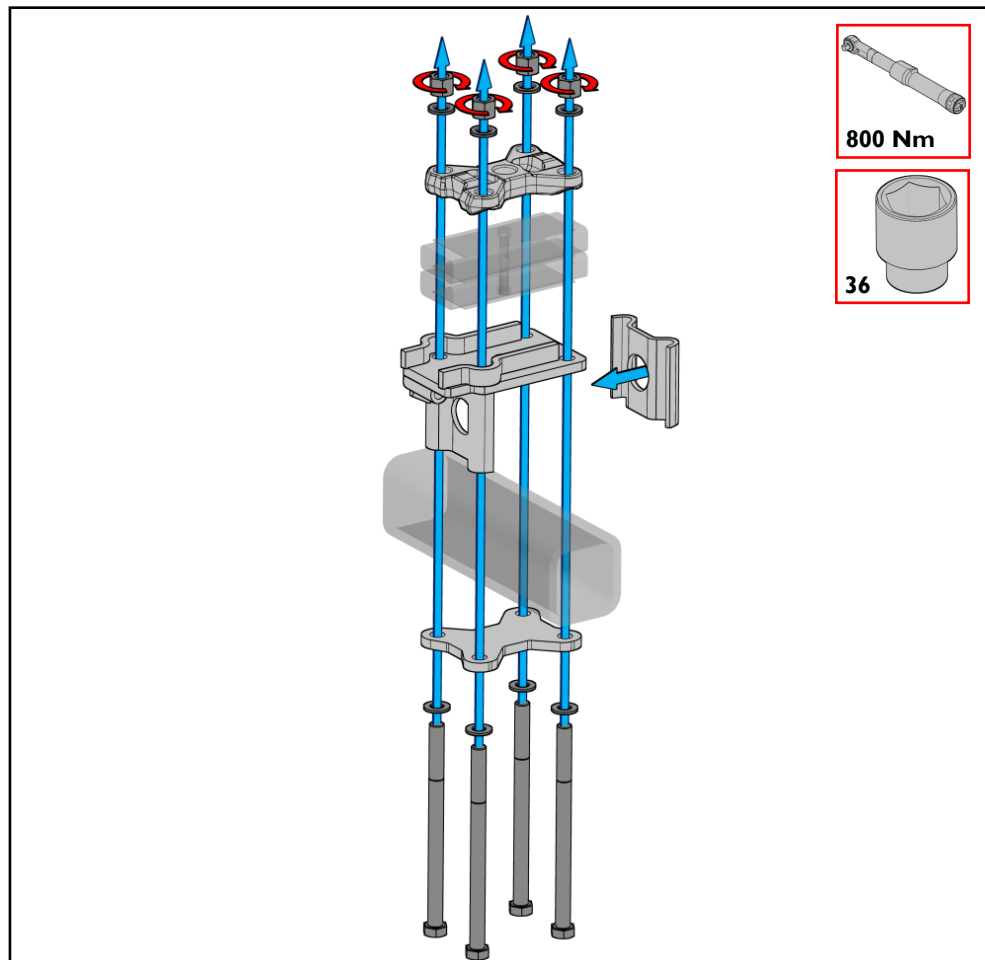
Front mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14. Available axle clampings

14.18 Axle seat □I50 (Type 7)

Underslung application

M24 Bolts

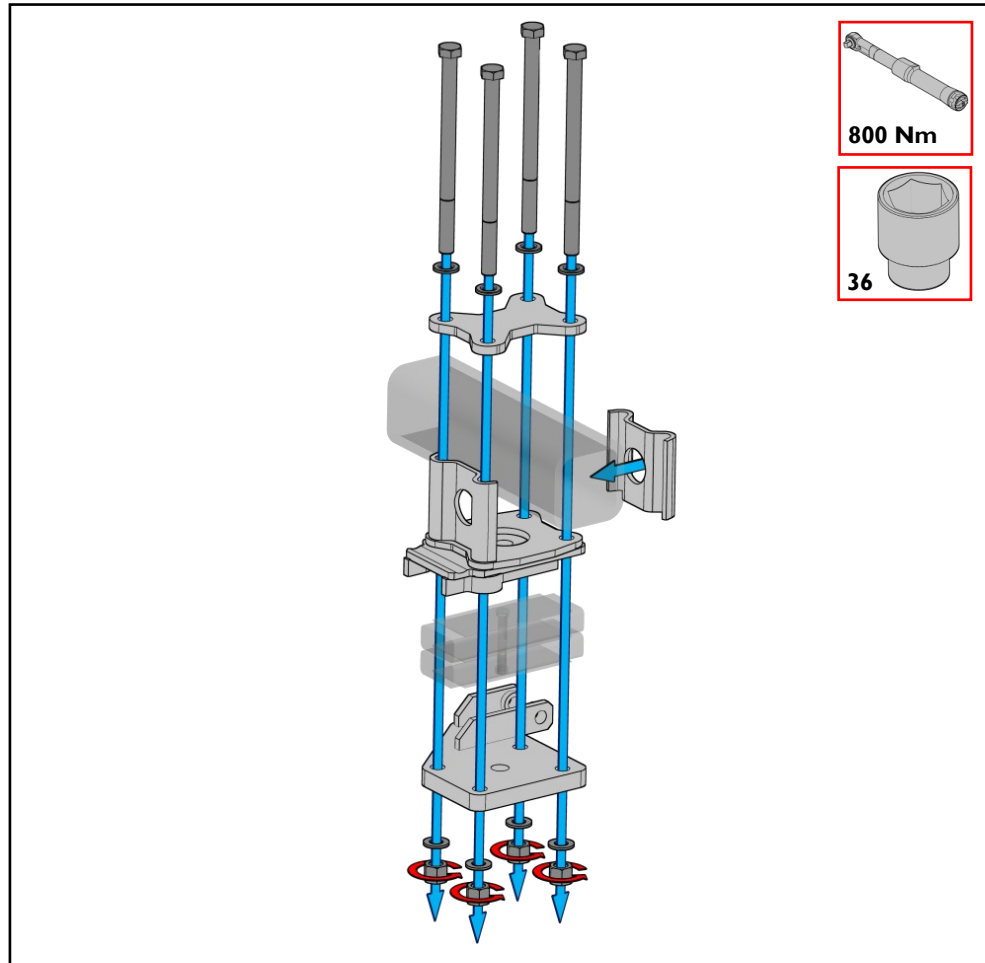
Rear mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14.19 Axle seat □I50 (Type 7)

Overslung application

M24 Bolts

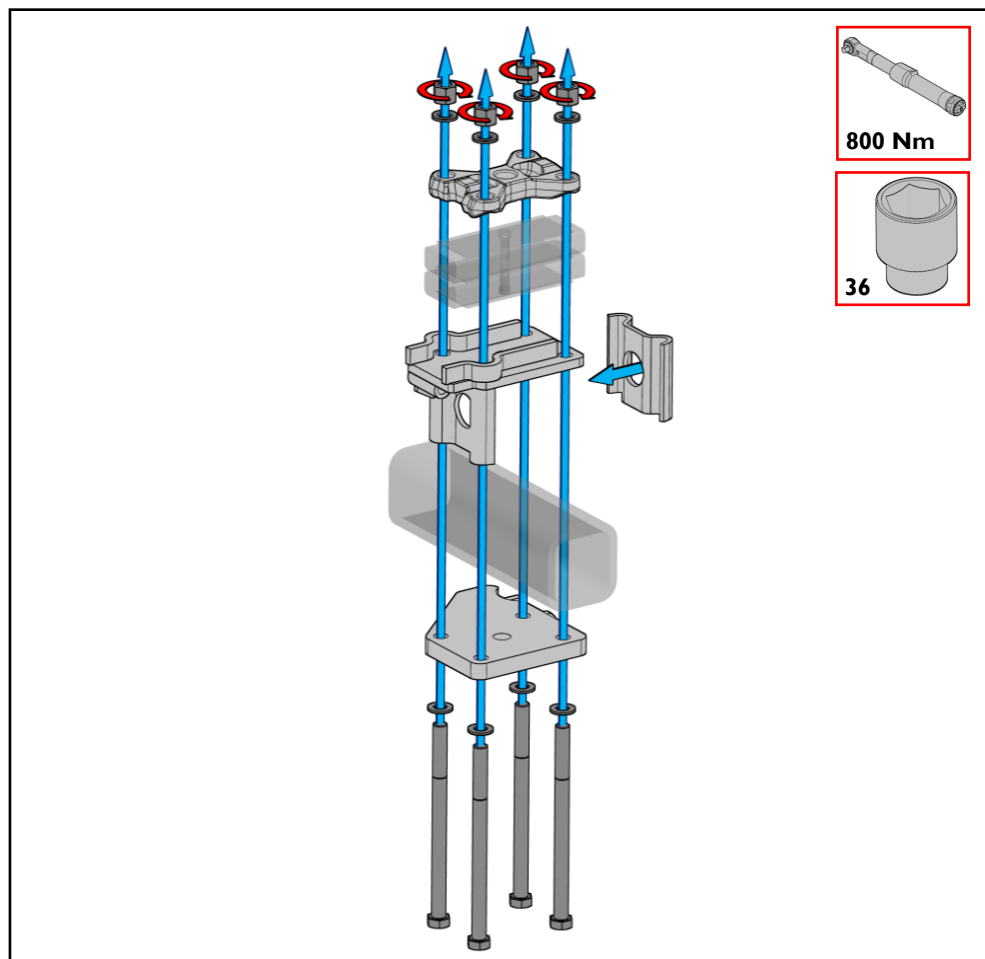
Rear mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14. Available axle clampings

14.20 Axle seat □I50 (Type 7A)

Overslung application

M24 U-Bolts

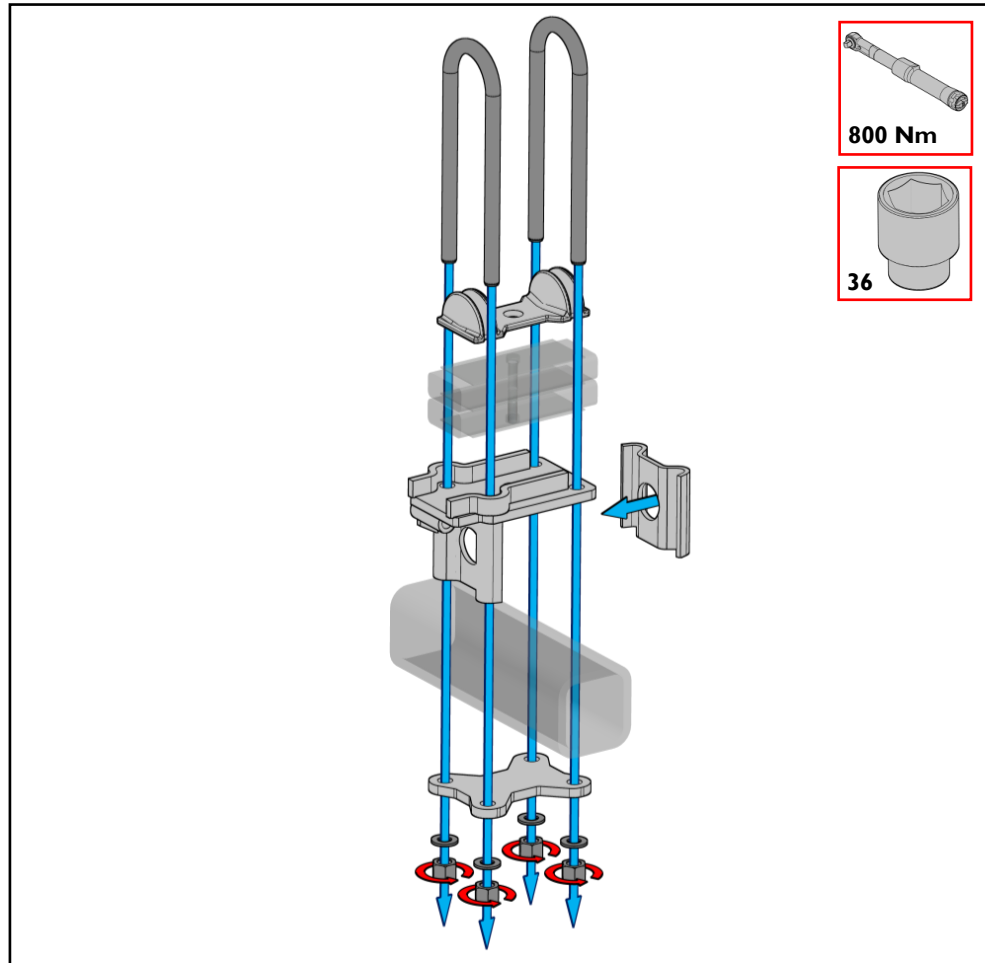
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14.21 Axle seat □I50 (Type 7A)

Overslung application

M24 U-Bolts

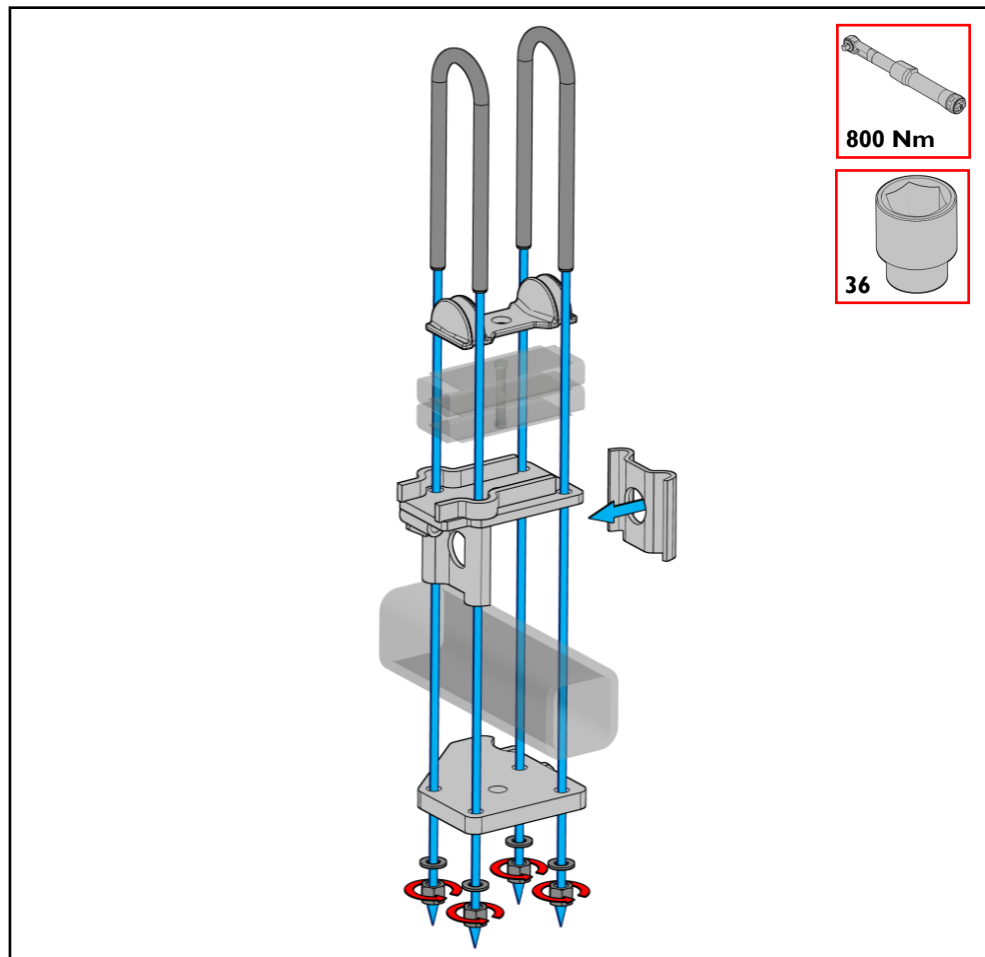
Rear mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.4

See tightening instructions: Section 10



14. Available axle clampings

14.22 HD axle seat □150 (Type 7B)

Overslung application

M24 U-Bolts

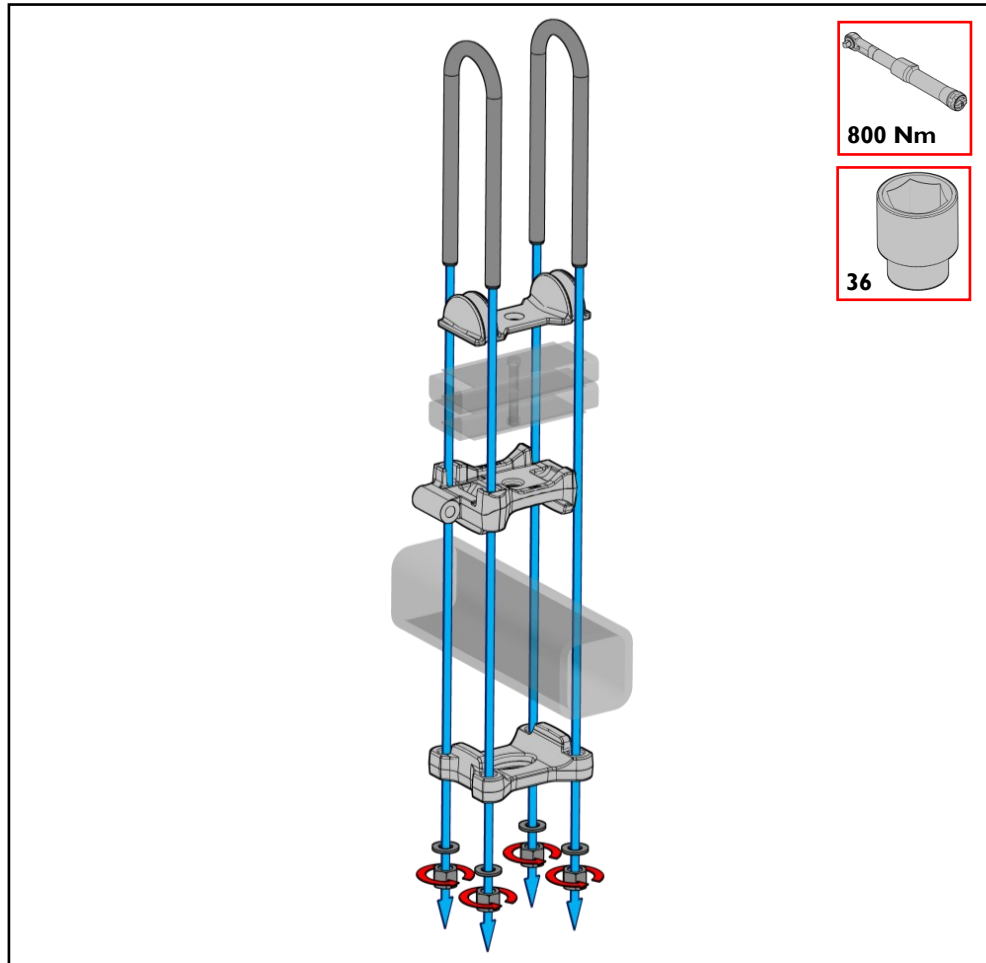
Front mounted shock absorbers

U-bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.5

See tightening instructions: Section 10



14.23 HD axle seat □150 (Type 7C)

Underslung application

M24 Bolts

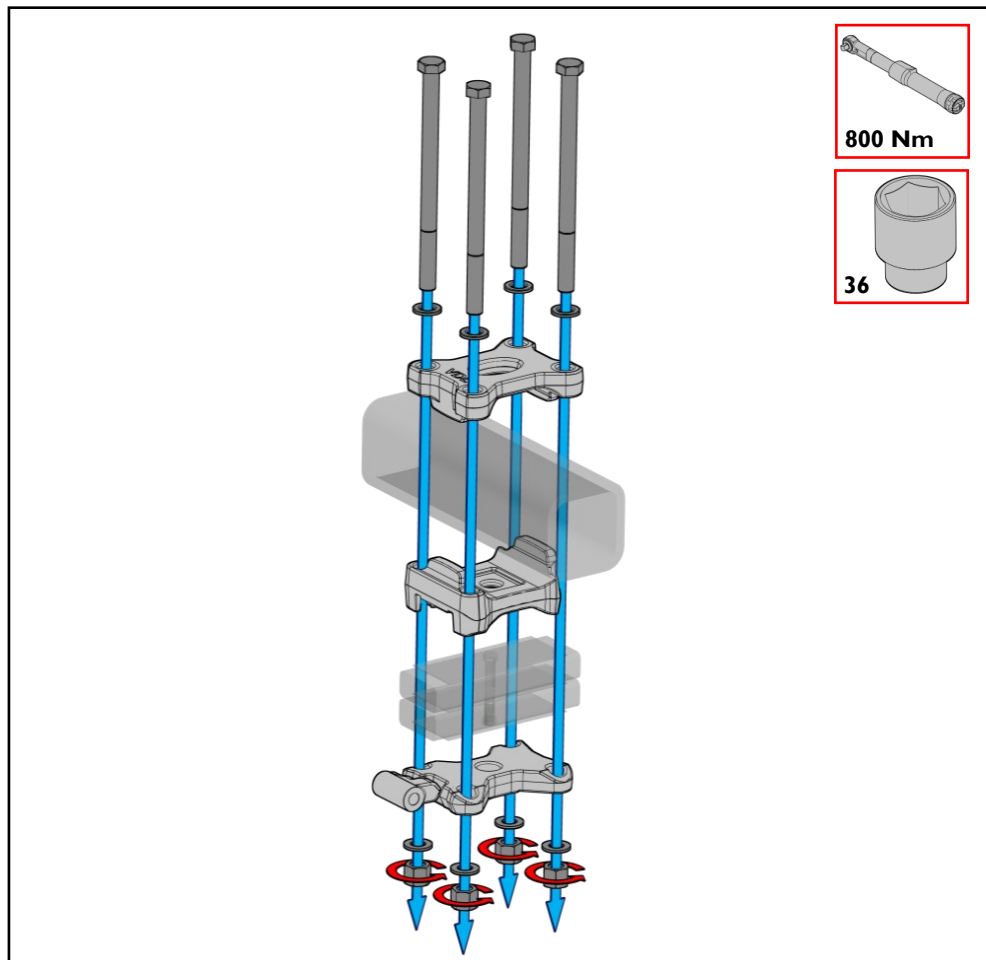
Front mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.5

See tightening instructions: Section 10



14. Available axle clampings

14.24 HD axle seat □150 (Type 7C)

Overslung application

M24 Bolts

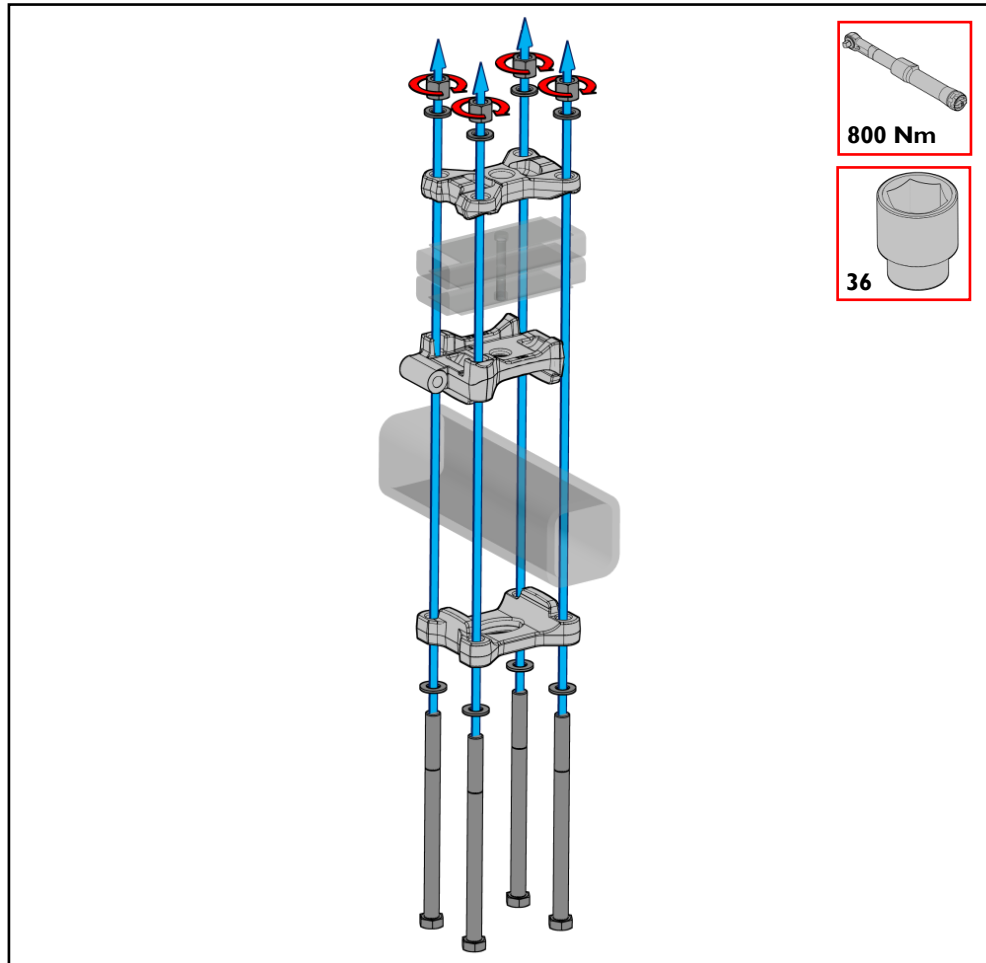
Front mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.5

See tightening instructions: Section 10



14.25 HD axle seat □150 (Type 7C)

Underslung application

M24 Bolts

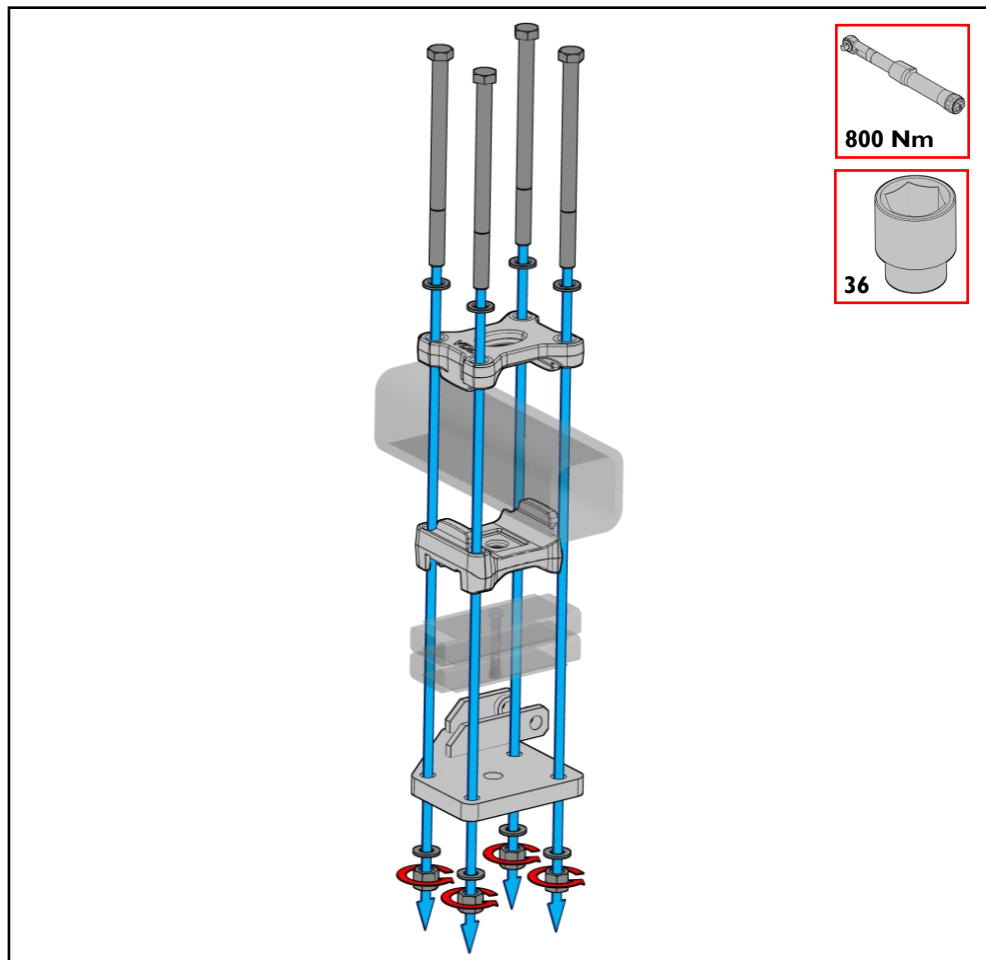
Rear mounted shock absorbers

Bolts vary in length depending on the total trailing arm thickness.

Example shows vehicle lefthand side.

See welding instructions: Section 4.5

See tightening instructions: Section 10



15. Available air spring options

15.1 Mounting of standard air spring assembly

Depending on the type of air suspension several air springs are available with or without additional required support plates for the desired air spring offset. Check the supplied system or application drawing for the supplied type of air spring and required offset. Follow the corresponding instruction step(s) below. All shown air spring options show the lefthand side of the vehicle.

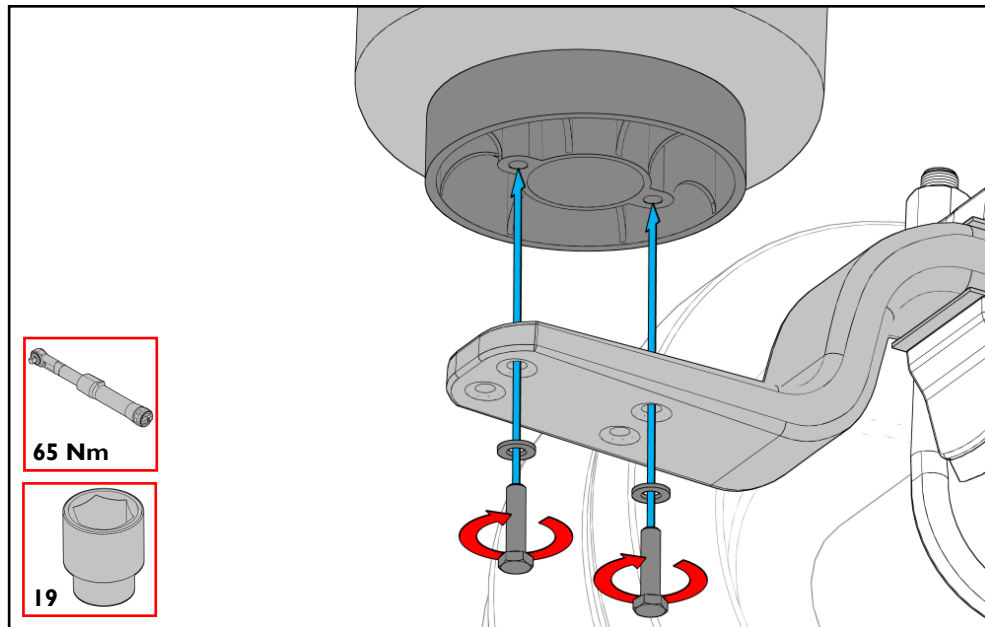
- Air spring Ø300	- Type 30 / 30C / 30L	- Offset 0 or 20mm	Step 15.2
- Air spring Ø300	- Type 30 / 30L	- Offset 65mm	Step 15.3
- Air spring Ø300	- Type 30 / 30L	- Offset 30 or 50mm	Step 15.4
- Air spring Ø350 standard	- Type 36 / 36L / 36LT / 36ML / 364 / 36L4 36M4	- Offset 30 or 50 or 95mm	Step 15.5
- Air spring Ø350 standard	- Type 36 / 36L / 36LT / 36ML / 364 / 36L4 36M4	- Offset 56	Step 15.6
- Air spring Ø350 reinforced	- Type 36R / 36LR	- Offset 30 or 50mm	Step 15.7
- Air spring Ø350 standard	- Type 36 / 36L / 36LT / 36ML / 364 / 36L4 36M4	- Offset 90mm	Step 15.8
- Air spring Ø350 swivel	- Type 36S / 36LS	- Offset 30 or 50 or 60 or 75 or 90mm	Step 15.9

15.2a Air spring Ø300 Offset 0 or 20mm

Mount the Ø300 air spring directly on the trailing arm with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according to the instructions.

The illustration shows an assembly that creates an air spring offset of 20mm.

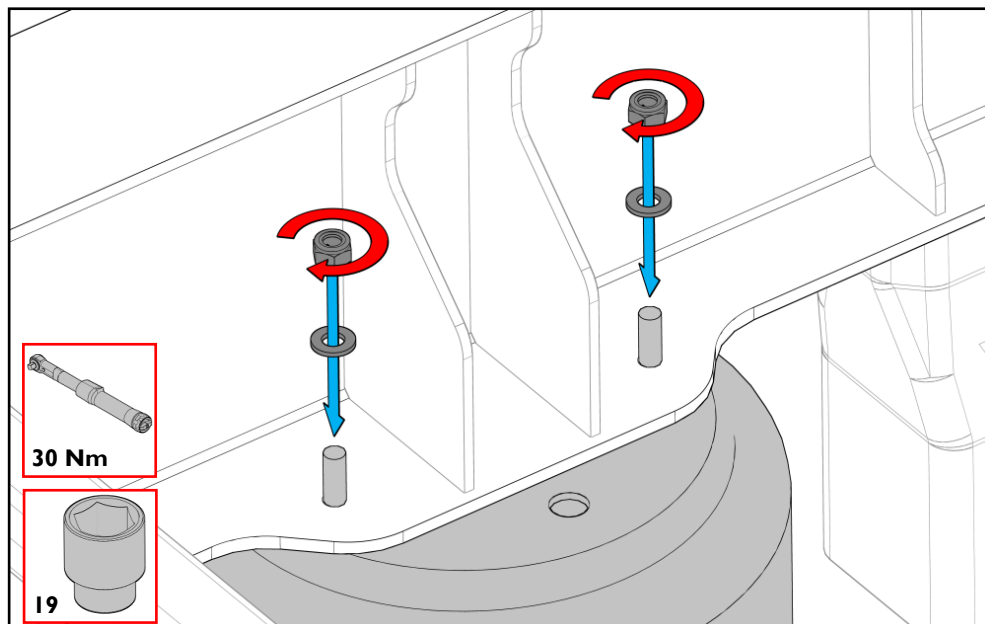
See tightening instructions: Section 10



15.2b Air spring to chassis / pedestal Ø300 standard 2 stud

Mount the Ø300 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according to the instructions.

See tightening instructions: Section 10

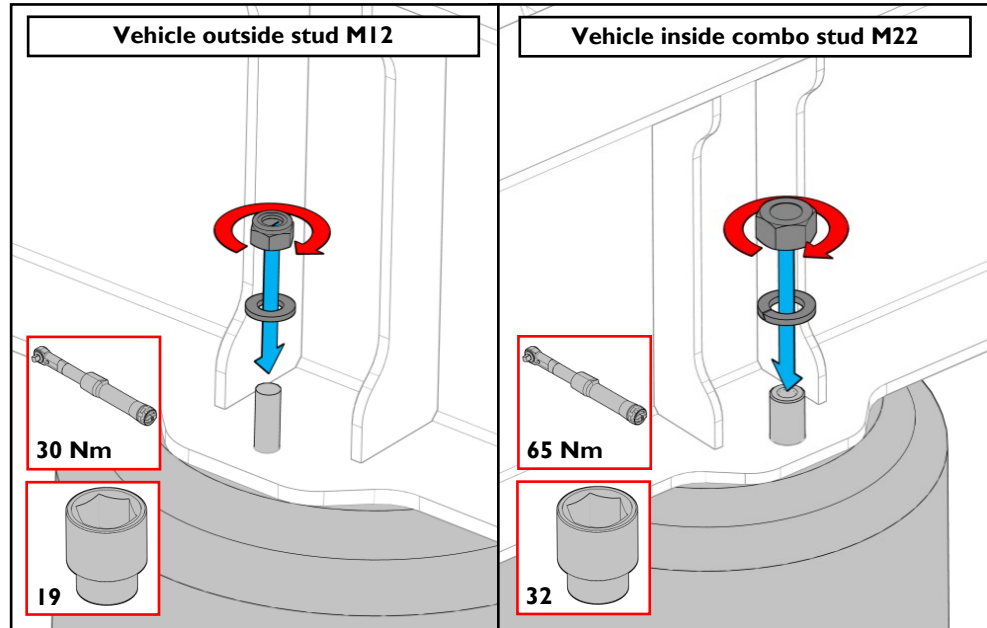


15. Available air spring options

15.2c Air spring to chassis / pedestal Ø300 combo stud

Mount the Ø300 air spring top with combo stud to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

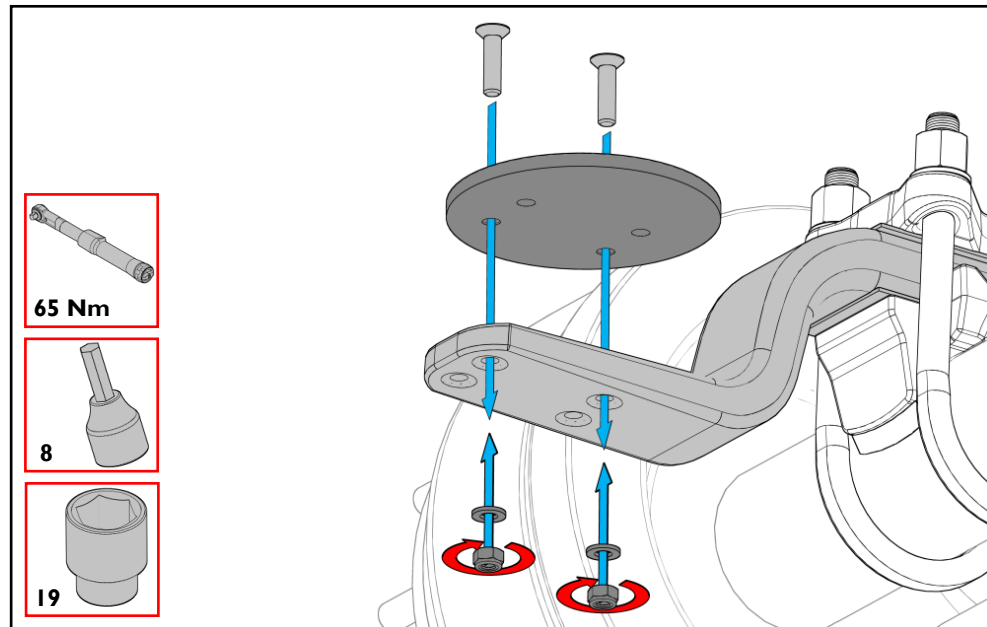
See tightening instructions: Section 10



15.3a Air spring Ø300 Offset 65mm

First mount the air spring support plate on the trailing arm with the M12 countersunk bolts. Tighten the locknuts to torque according the instructions.

See tightening instructions: Section 10

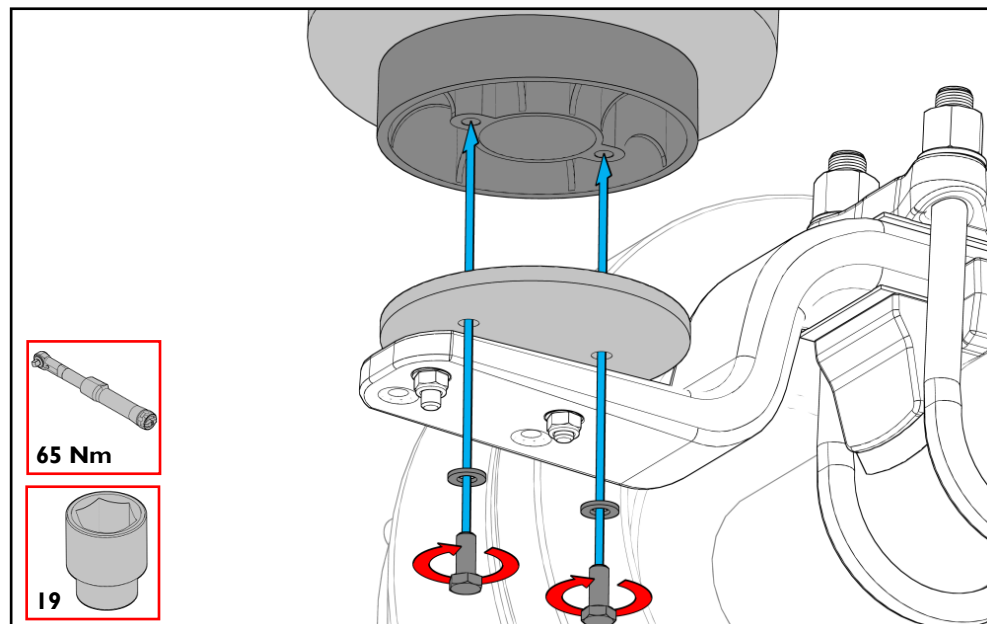


15.3b Air spring Ø300 Offset 65mm

Finally mount the Ø300 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according the instructions.

Follow the same steps for the other side.

See tightening instructions: Section 10

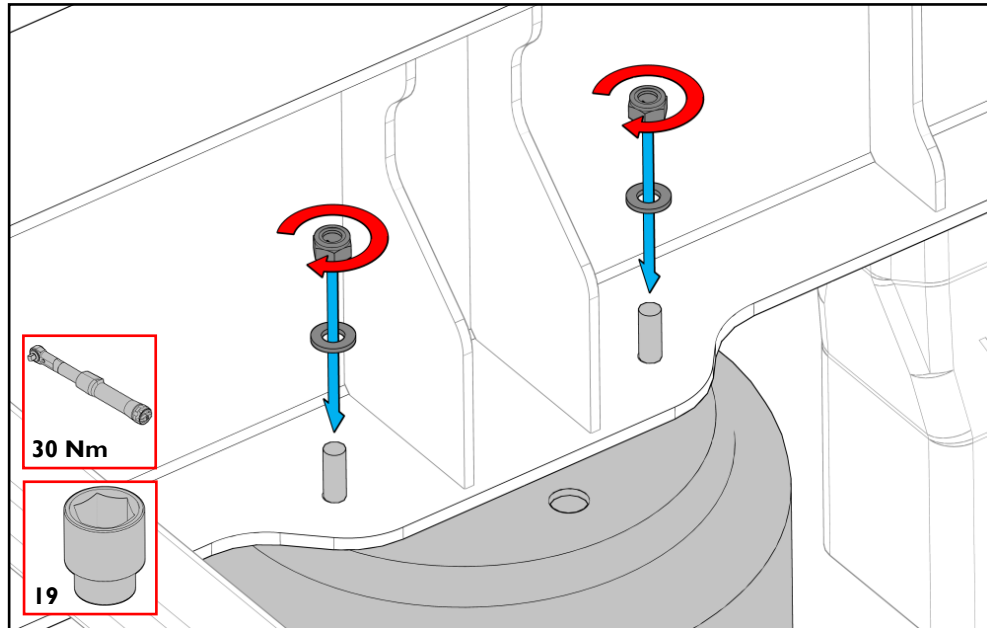


15. Available air spring options

15.3c Air spring to chassis / pedestal Ø300 standard 2 stud

Mount the Ø300 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

See tightening instructions: Section 10

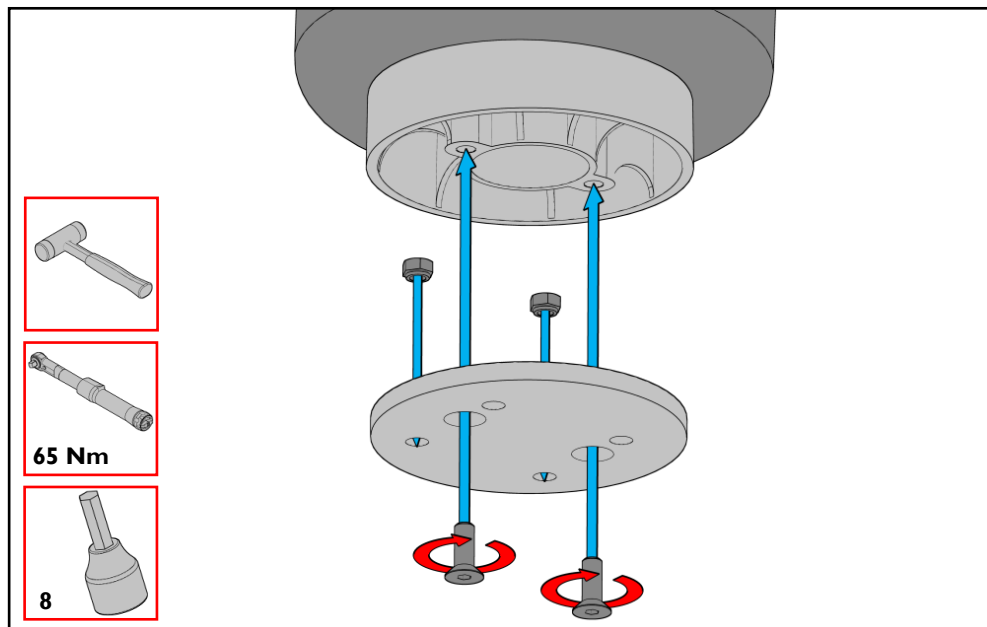


15.4a Air spring Ø300 Offset 30 or 50mm

First mount the M12 kalei set nuts on the support plate with a rubber/plastic hammer until the collar is fully pressed into the plate and the nut lies flush with the plate.

Next mount the Ø300 air spring to the support plate with the M12 countersunk bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according the instructions.

See tightening instructions: Section 10

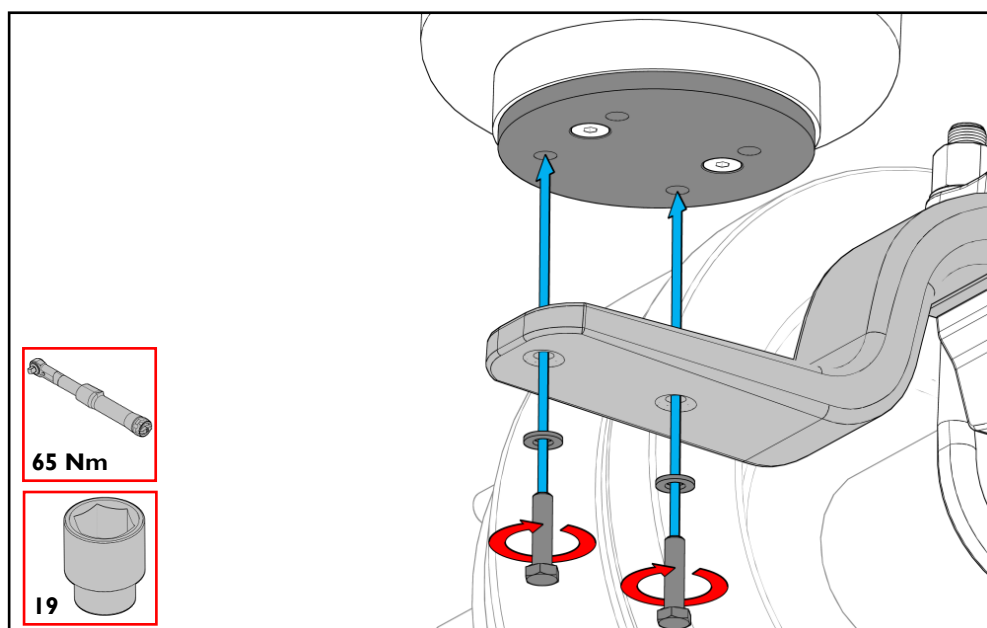


15.4b Air spring Ø300 Offset 30 or 50mm

Finally mount the support plate with the Ø300 air spring to the trailing arm with the M12 bolts. Tighten to torque according the instructions.

The illustration shows an assembly that creates an air spring offset of 50mm using the outer most holes of the support plate. The other holes create an offset of 30mm.

See tightening instructions: Section 10

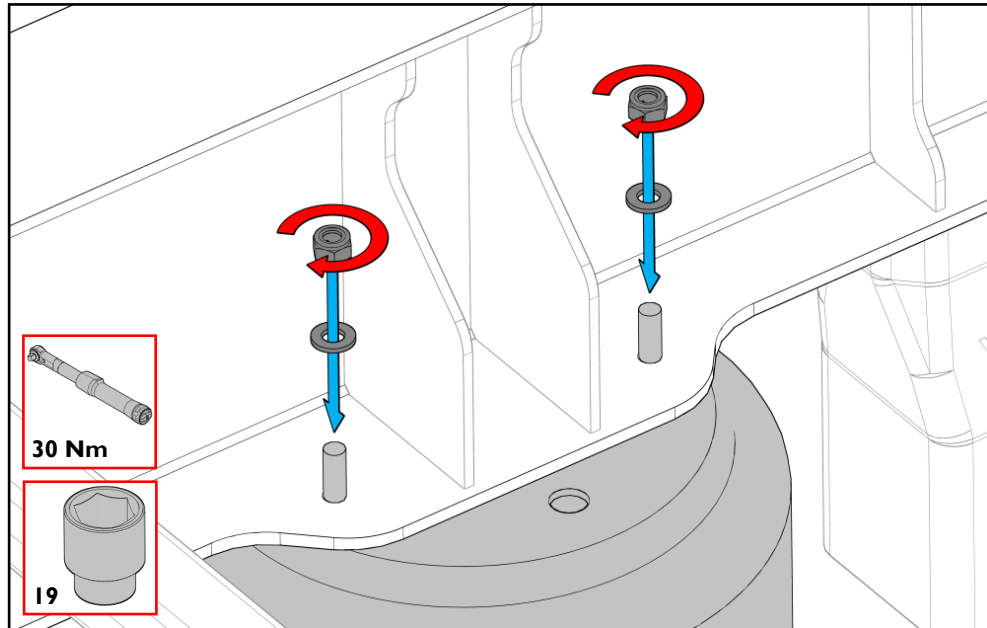


15. Available air spring options

15.4c Air spring to chassis / pedestal Ø300 standard 2 stud

Mount the Ø300 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

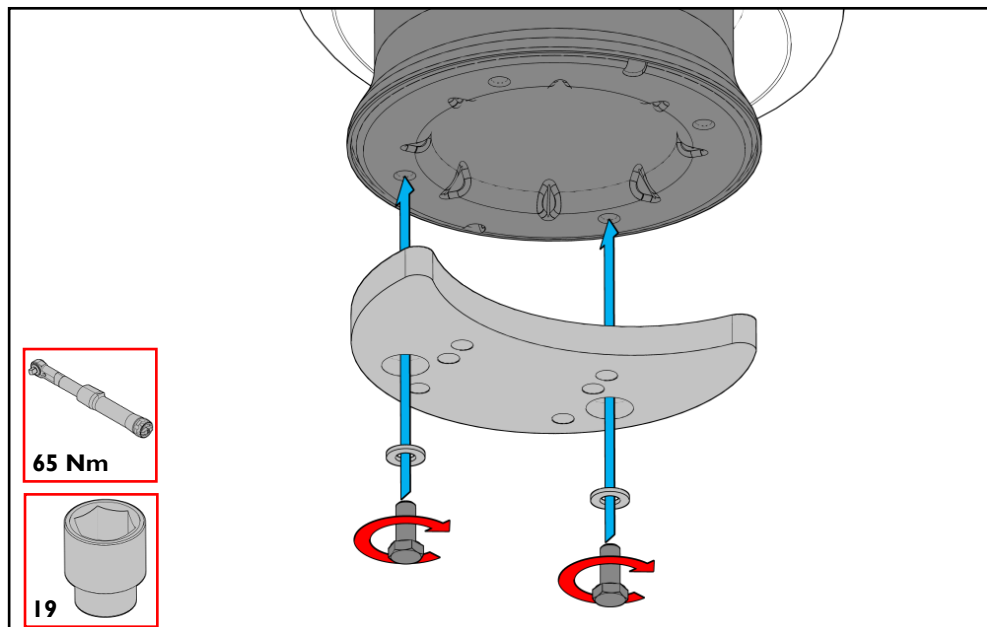
See tightening instructions: Section 10



15.5a Air spring Ø350 Offset 30 or 50 or 95mm

First mount the Ø350 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according the instructions.

See tightening instructions: Section 10



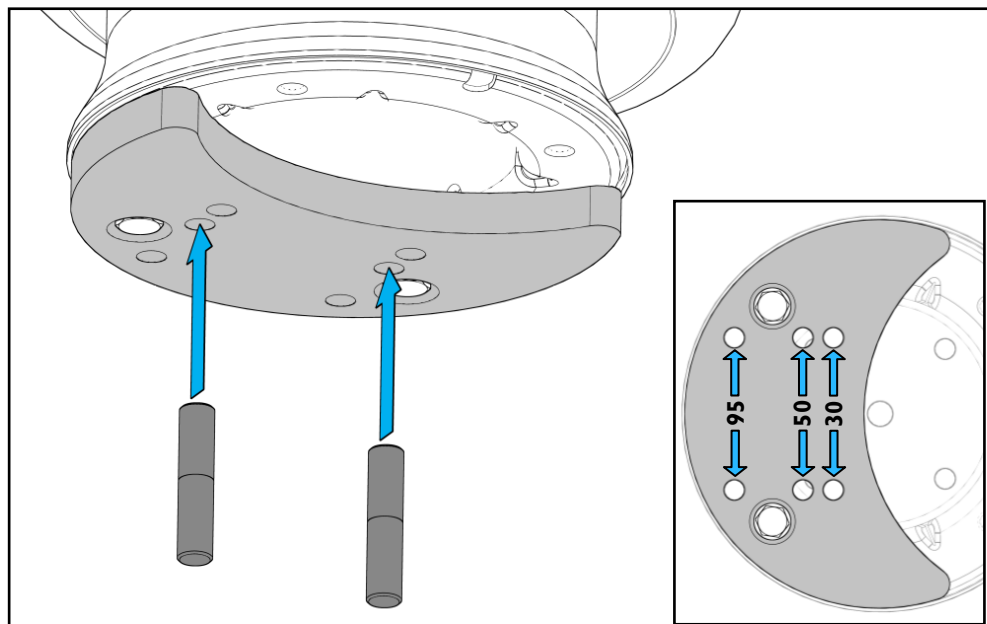
15.5b Air spring Ø350 Offset 30 or 50 or 95mm

Hand tighten the M16 studs in the air spring until it is fastened.

The support plate is suitable for multiple air spring offsets. Offset 30, 50 or 95mm. Choose the correct holes for the correct air spring offset.

Make sure the short threaded side goes in the support plate.

The illustration shows an assembly that creates an air spring offset of 50mm.

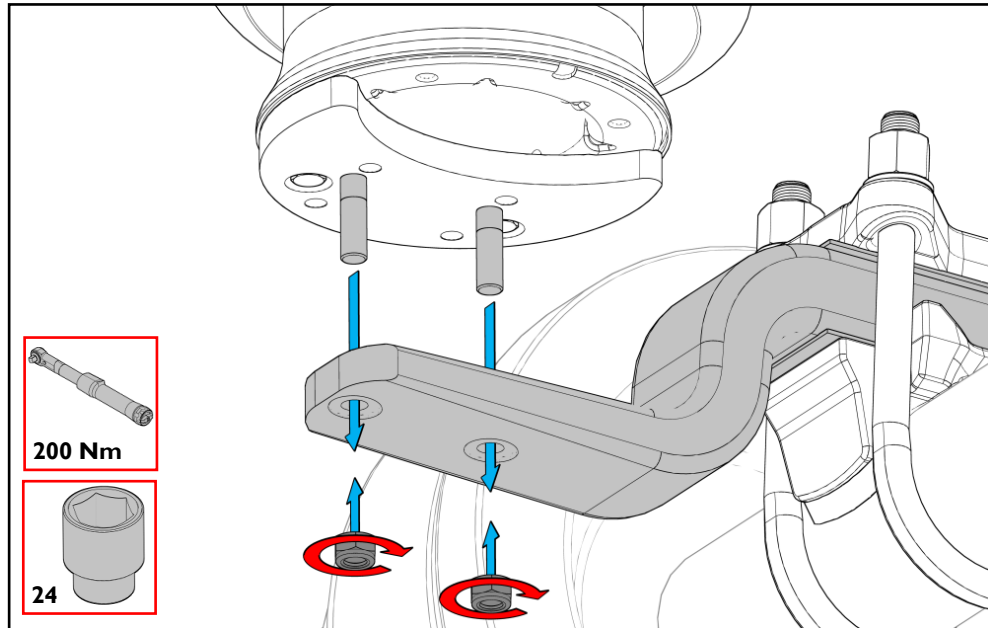


15. Available air spring options

15.5c Air spring Ø350 Offset 30 or 50 or 95mm

Finally mount the complete support plate with Ø350 air spring on the trailing arm. Tighten the locknuts to torque according to the instructions.

See tightening instructions: Section 10

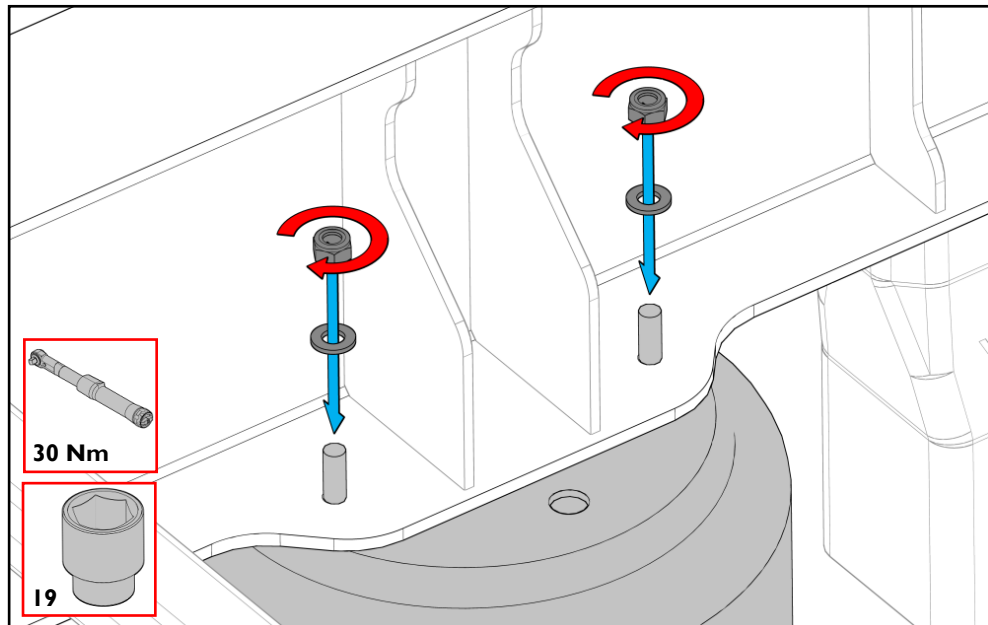


15.5d Air spring to chassis / pedestal Ø350 standard 2 stud

Mount the Ø350 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according to the instructions.

Illustration shows the 2-stud standard configuration. For the special 4-stud air springs the settings are the same.

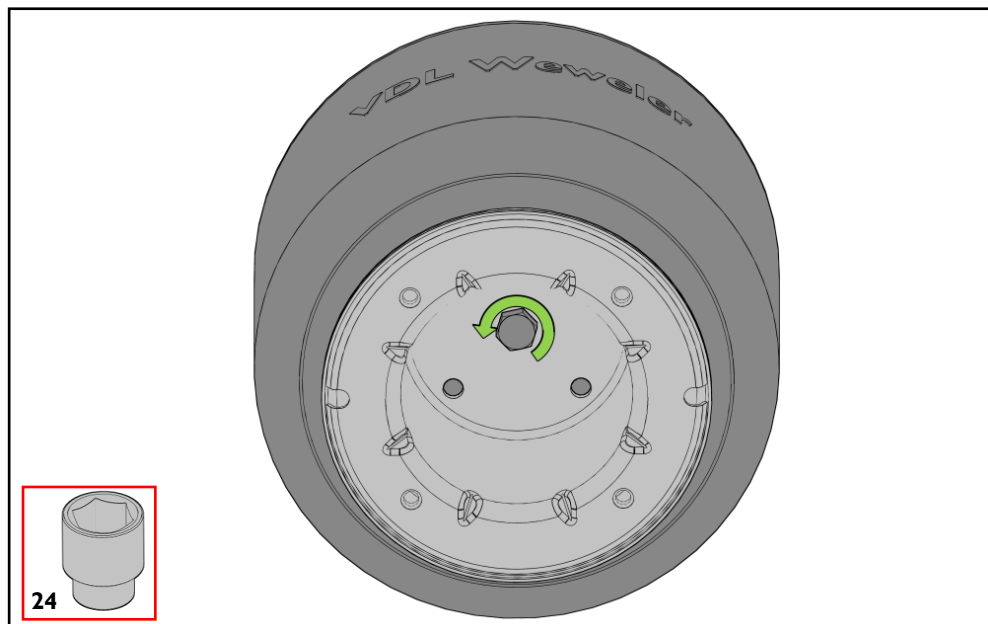
See tightening instructions: Section 10



15.6a Air spring Ø350 Offset 56mm

The use of the 56mm offset plate results in a 45° rotated air spring position. To correct the position of the studs on the top bead plate the air spring flexmember has to be rotated in relation to the piston before mounting.

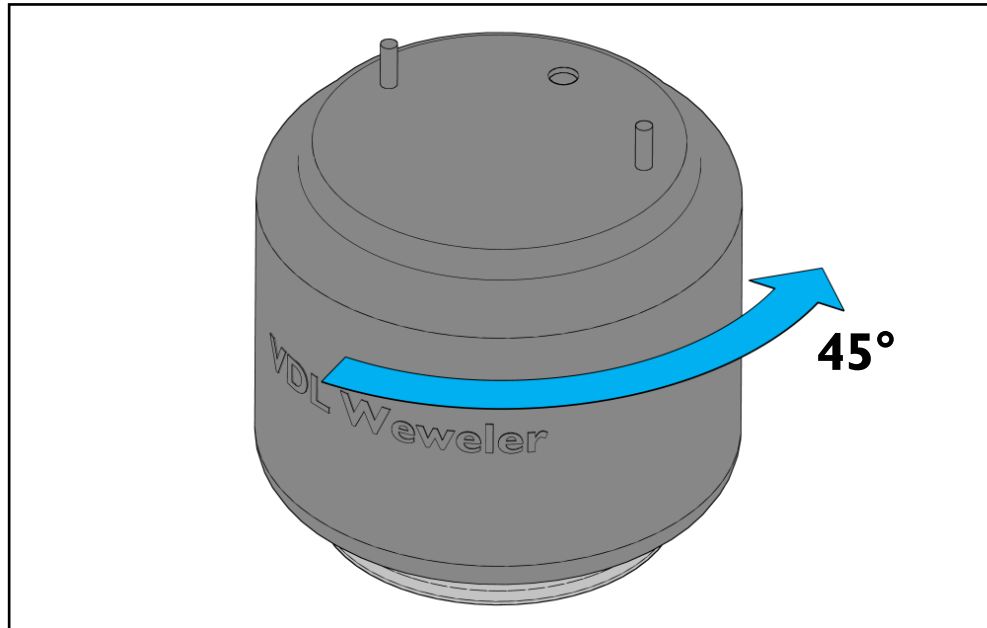
For this untighten the central M16 piston bolt slightly but don't remove the bolt.



15. Available air spring options

15.6b Air spring Ø350 Offset 56mm

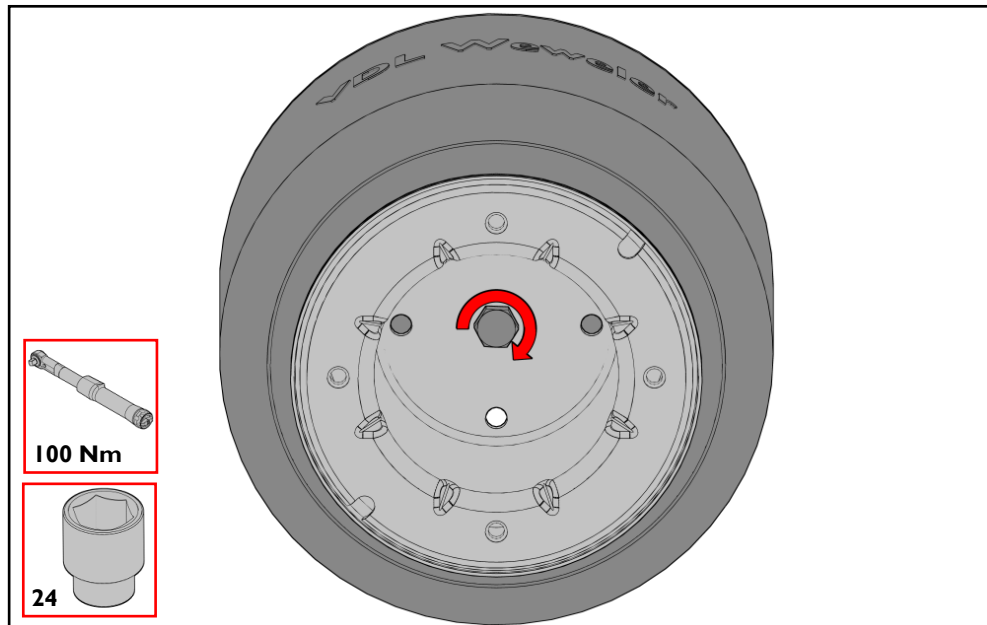
Next rotate the flexmember and bead plate 45° in relation to the piston.



15.6c Air spring Ø350 Offset 56mm

Tighten the central piston M16 bolt again at 100Nm torque.

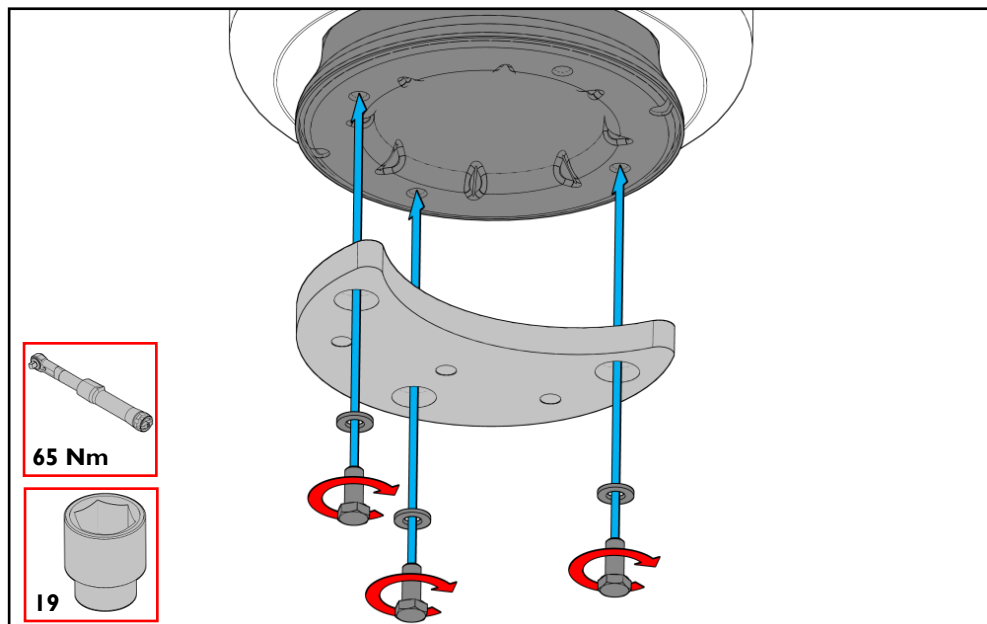
The air spring is now ready to be mounted to the offset plate.



15.6d Air spring Ø350 Offset 56mm

First mount the Ø350 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according to the instructions.

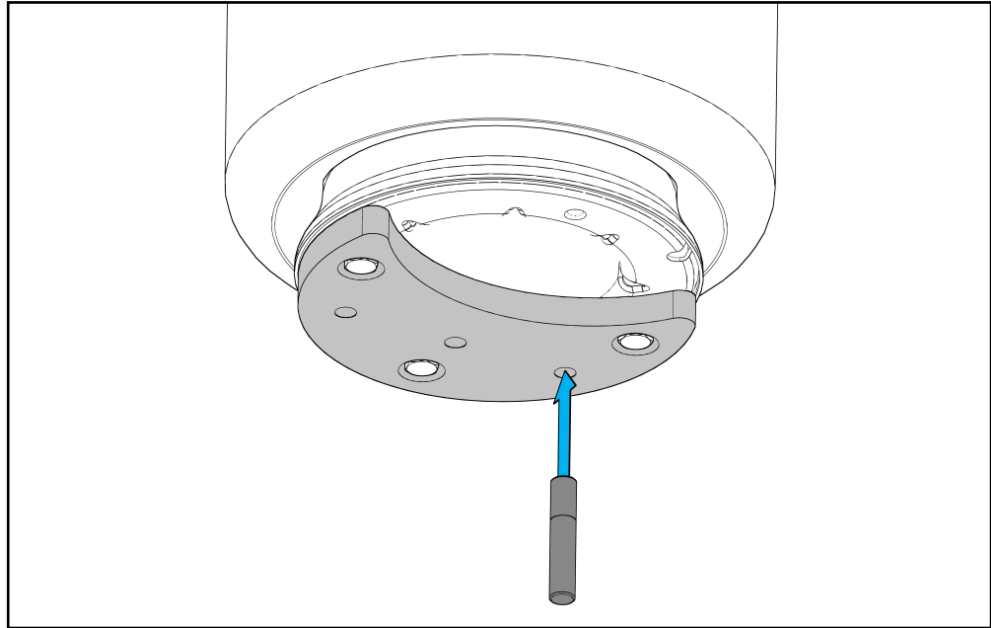
See tightening instructions: Section 10



15. Available air spring options

15.6e Air spring Ø350 Offset 56mm

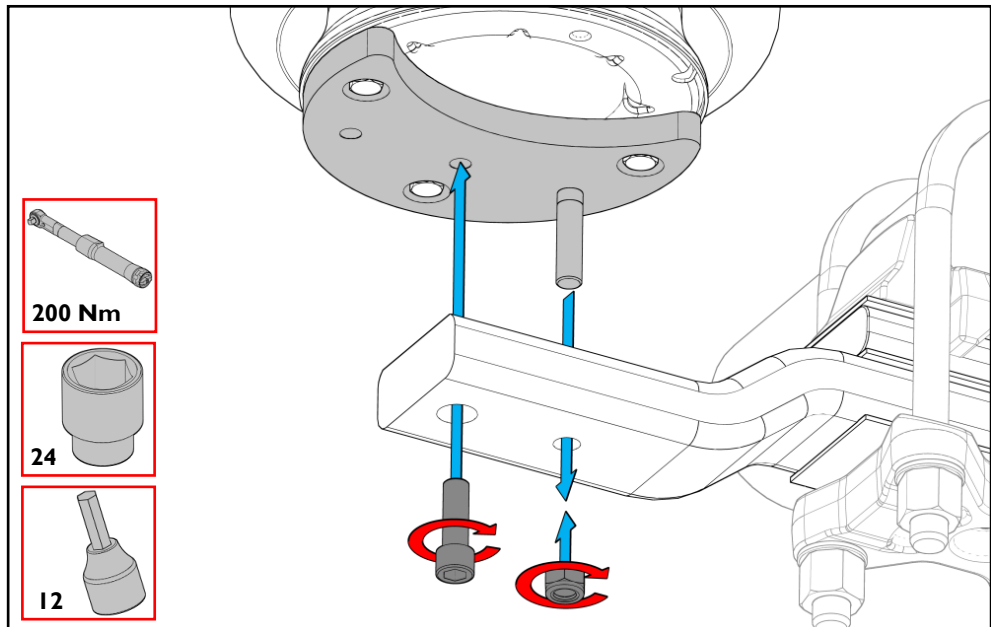
Hand tighten the M16 stud in the hole closest to the axle of support plate until it is fastened. Vehicle lefthand side is drawn. Make sure the short threaded side goes in the support plate.



15.6f Air spring Ø350 Offset 56mm

Finally mount the complete support plate with Ø350 air spring on the trailing arm. Tighten the locknut and M16 allen bolt to torque according the instructions.

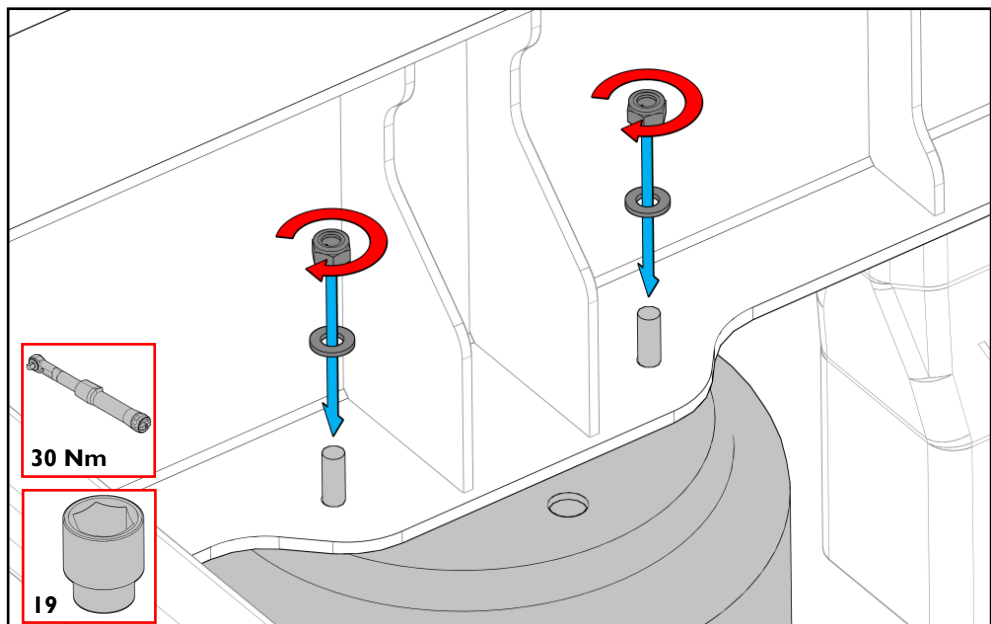
See tightening instructions: Section 10



15.6g Air spring to chassis / pedestal Ø350 standard 2 stud

Mount the Ø350 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions. Illustration shows the 2-stud standard configuration. For the special 4-stud air springs the settings are the same.

See tightening instructions: Section 10



15. Available air spring options

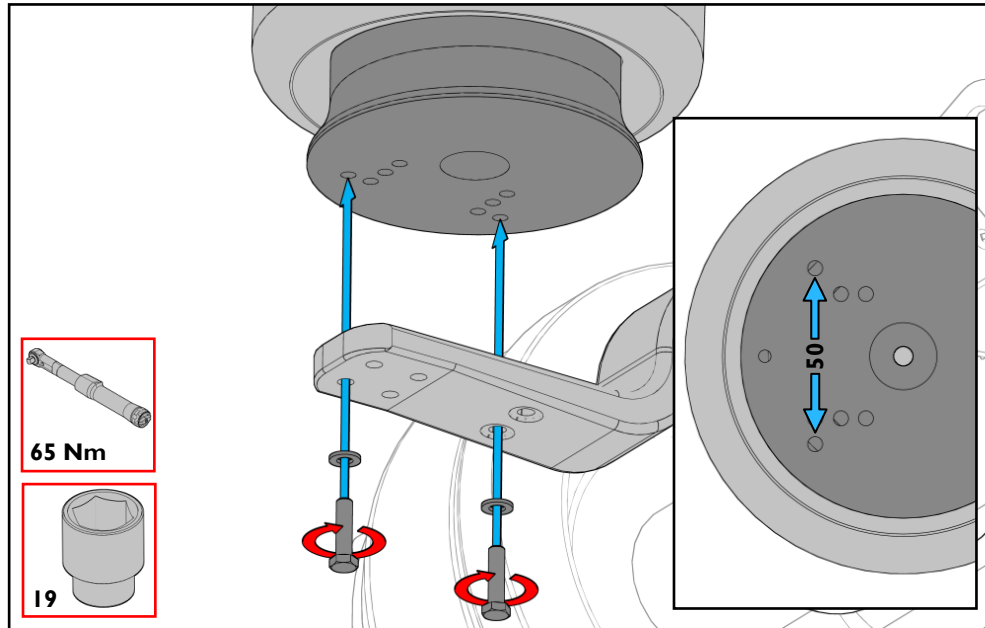
15.7a Air spring Ø350 - Reinforced E & I serie Trailing arm Offset 50mm

Mount the Ø350 air spring with reinforced piston directly on the trailing arm with the M12 bolts. Tighten to torque according the instructions.

Make sure to use the correct holes in the piston. See the image on the far right.

See **step 15.7f** for the connection with the chassis or pedestal.

See tightening instructions: Section 10



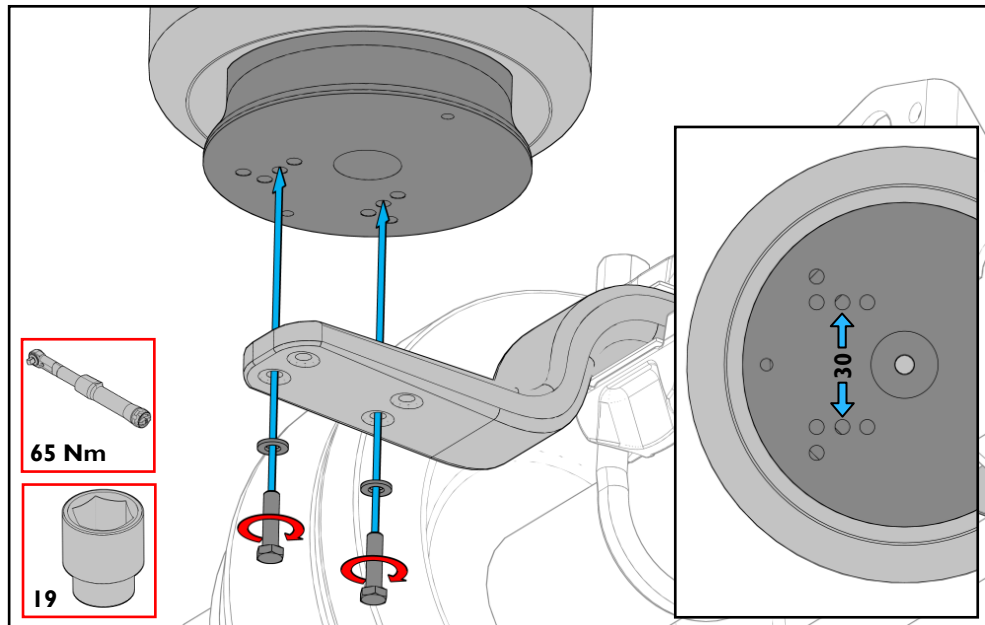
15.7b Air spring Ø350 - Reinforced 4-hole H serie Trailing arm Offset 30mm

Mount the Ø350 air spring with reinforced piston directly on the trailing arm with the M12 bolts. Tighten to torque according the instructions.

Make sure to use the correct holes in the piston. See the image on the far right.

See **step 15.7f** for the connection with the chassis or pedestal.

See tightening instructions: Section 10



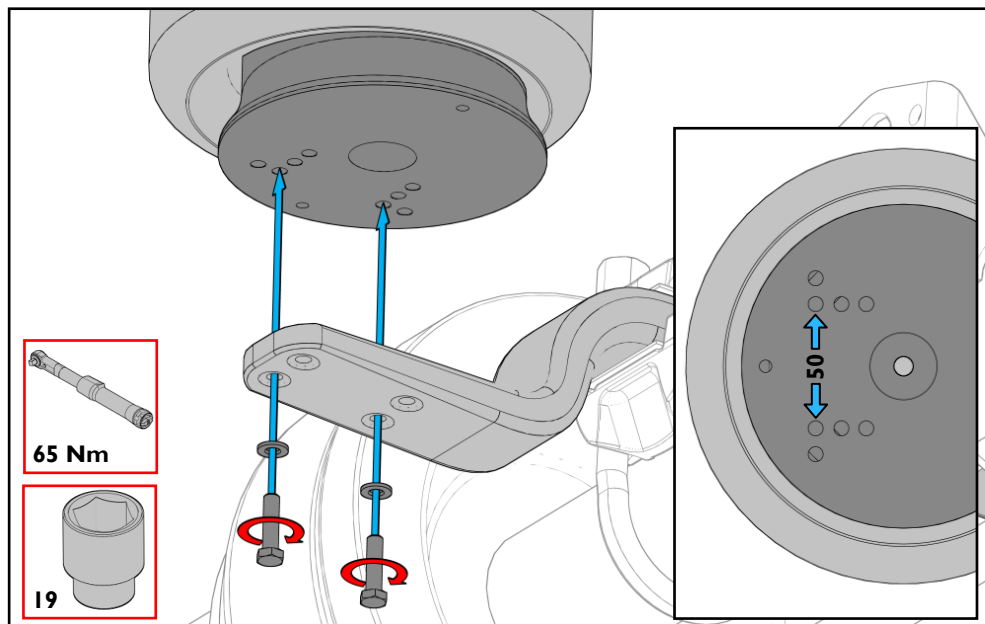
15.7c Air spring Ø350 - Reinforced 4-hole H serie Trailing arm Offset 50mm

Mount the Ø350 air spring with reinforced piston directly on the trailing arm with the M12 bolts. Tighten to torque according the instructions.

Make sure to use the correct holes in the piston. See the image on the far right.

See **step 15.7f** for the connection with the chassis or pedestal.

See tightening instructions: Section 10



15. Available air spring options

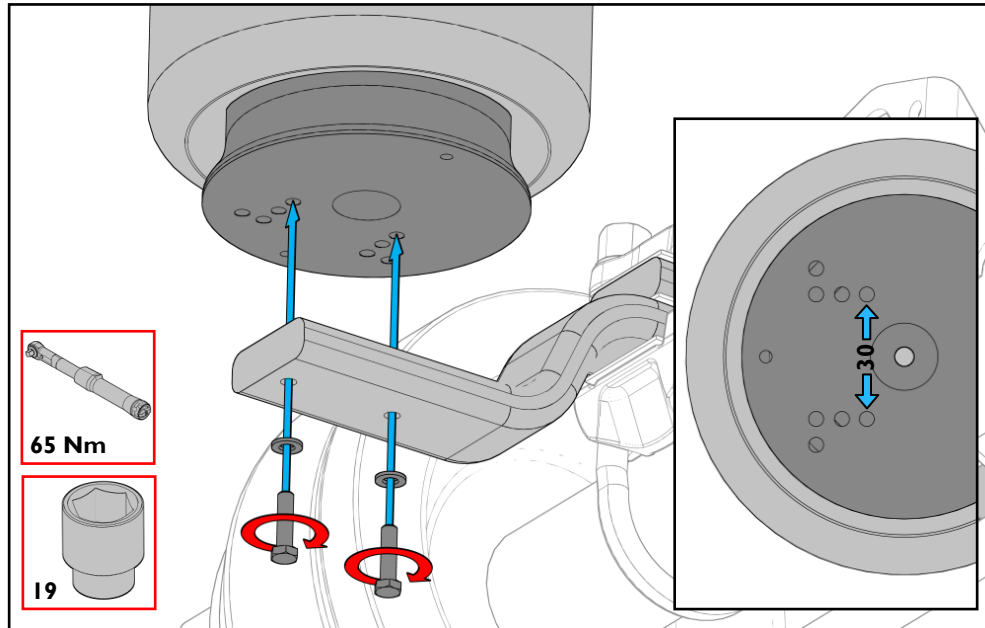
15.7d Air spring Ø350 - Reinforced 2-hole H & D serie Trailing arm Offset 30mm

Mount the Ø350 air spring with reinforced piston directly on the trailing arm with the M12 bolts. Tighten to torque according the instructions.

Make sure to use the correct holes in the piston. See the image on the far right.

See **step 15.7f** for the connection with the chassis or pedestal.

See tightening instructions: Section 10



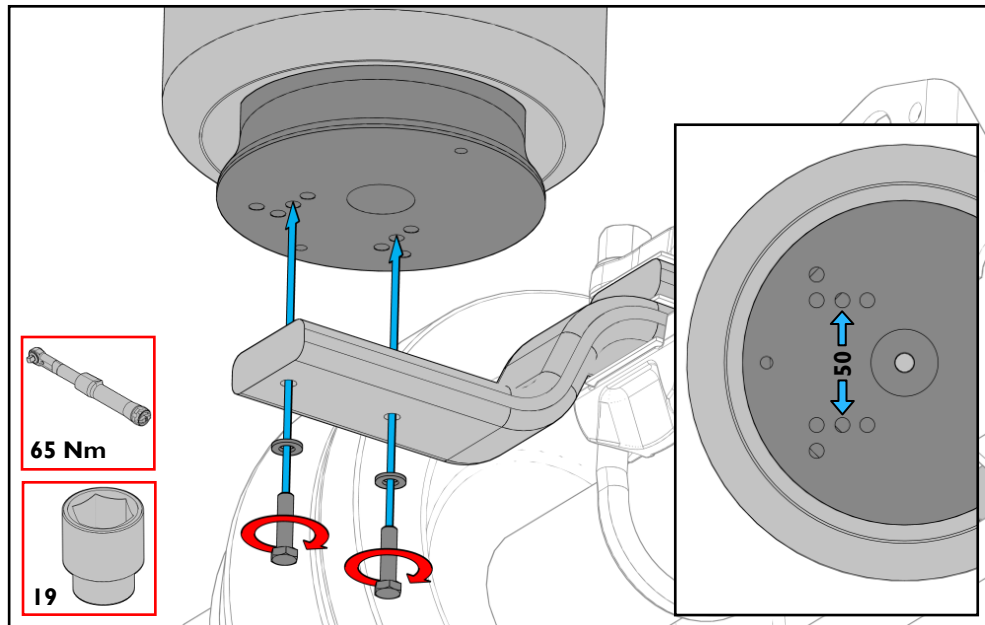
15.7e Air spring Ø350 - Reinforced 2-hole H & D serie Trailing arm Offset 50mm

Mount the Ø350 air spring with reinforced piston directly on the trailing arm with the M12 bolts. Tighten to torque according the instructions.

Make sure to use the correct holes in the piston. See the image on the far right.

See **step 15.7f** for the connection with the chassis or pedestal.

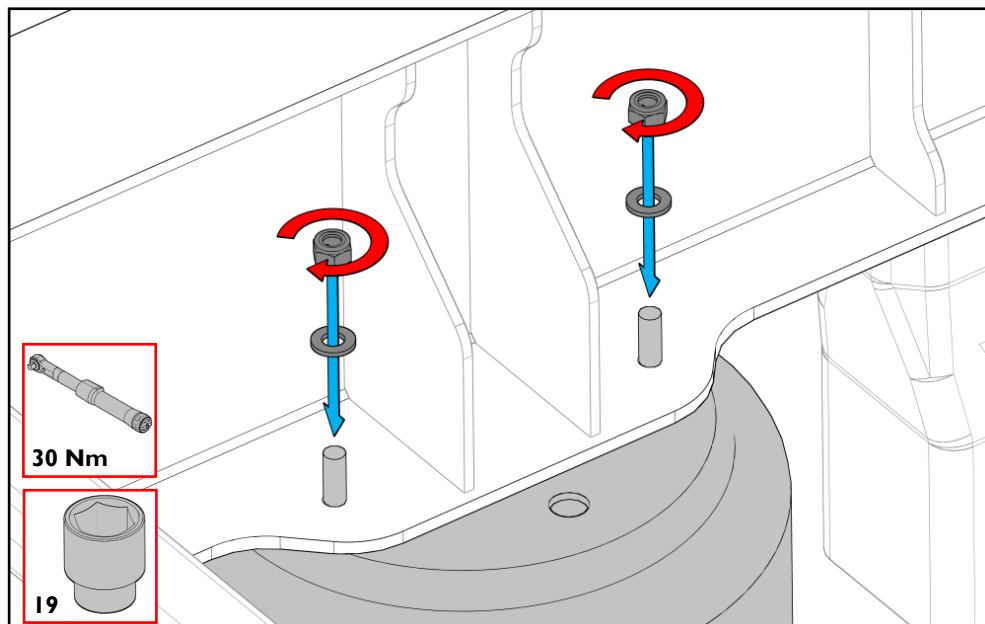
See tightening instructions: Section 10



15.7f Air spring to chassis / pedestal

Mount the Ø350 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

See tightening instructions: Section 10

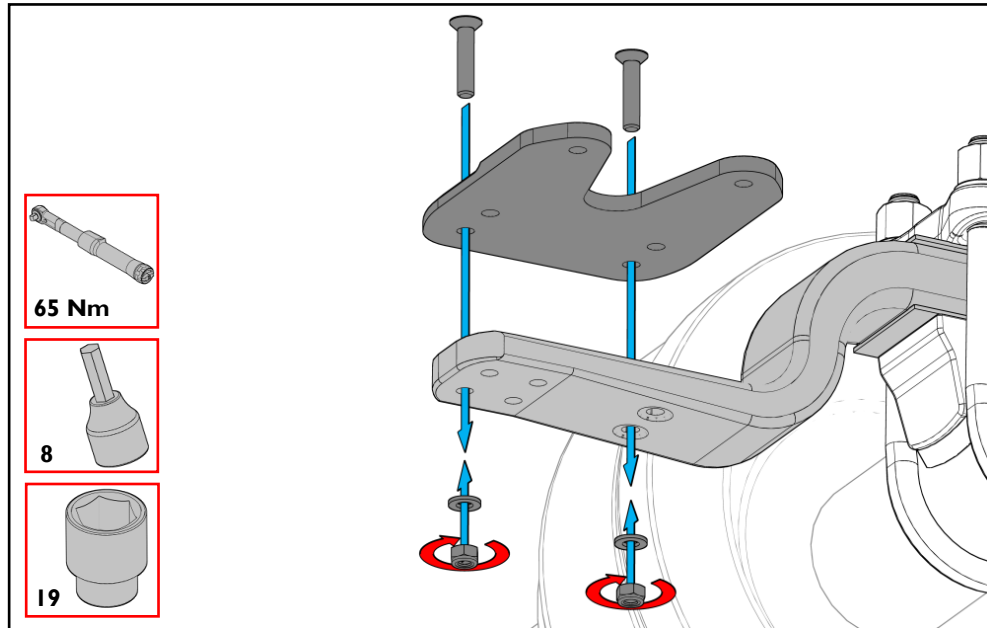


15. Available air spring options

15.8a Air spring Ø350 Offset 90mm

First mount the air spring support plate on the trailing arm with the M12 countersunk bolts. Tighten the locknuts to torque according the instructions.

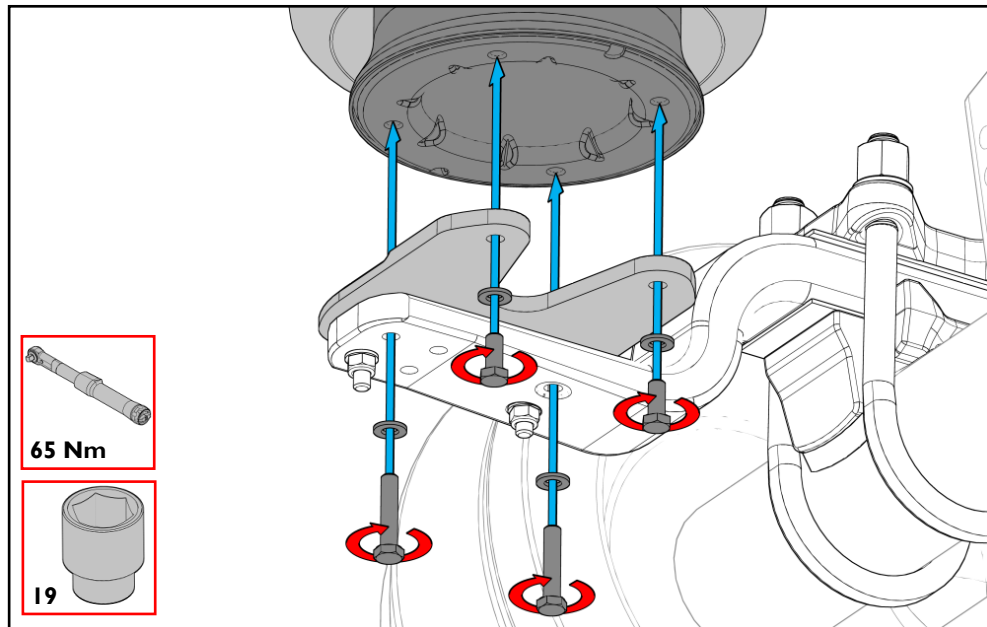
See tightening instructions: Section 10



15.8b Air spring Ø350 Offset 90mm

Finally mount the Ø350 air spring to the support plate with the M12 bolts. Make sure the studs on top of the air spring are on the correct side. Tighten to torque according the instructions.

See tightening instructions: Section 10

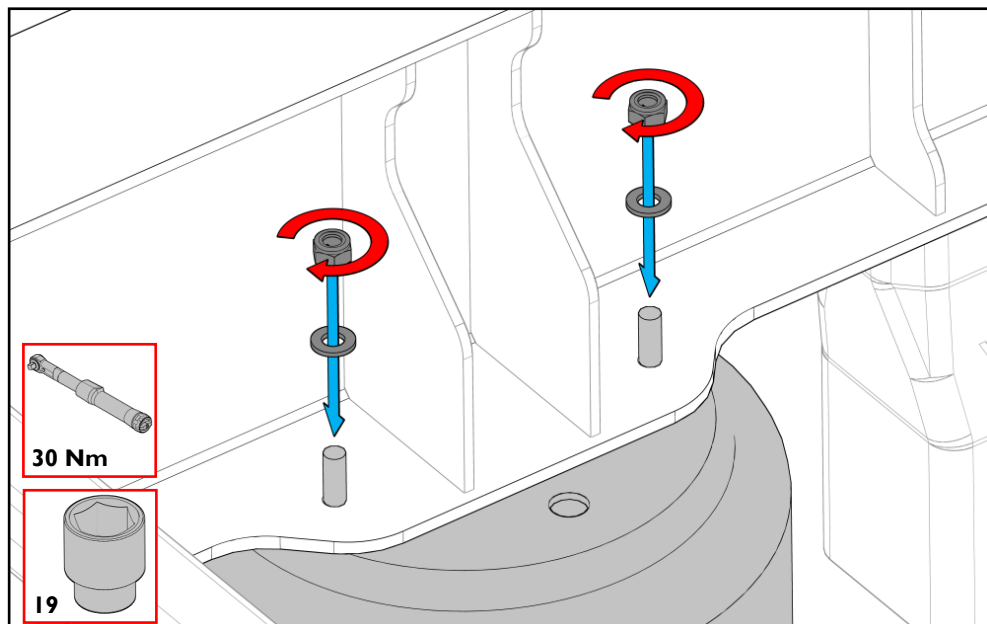


15.8c Air spring to chassis / pedestal Ø350 standard 2 stud

Mount the Ø350 air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

Illustration shows the 2-stud standard configuration. For the special 4-stud air springs the settings are the same.

See tightening instructions: Section 10



15. Available air spring options

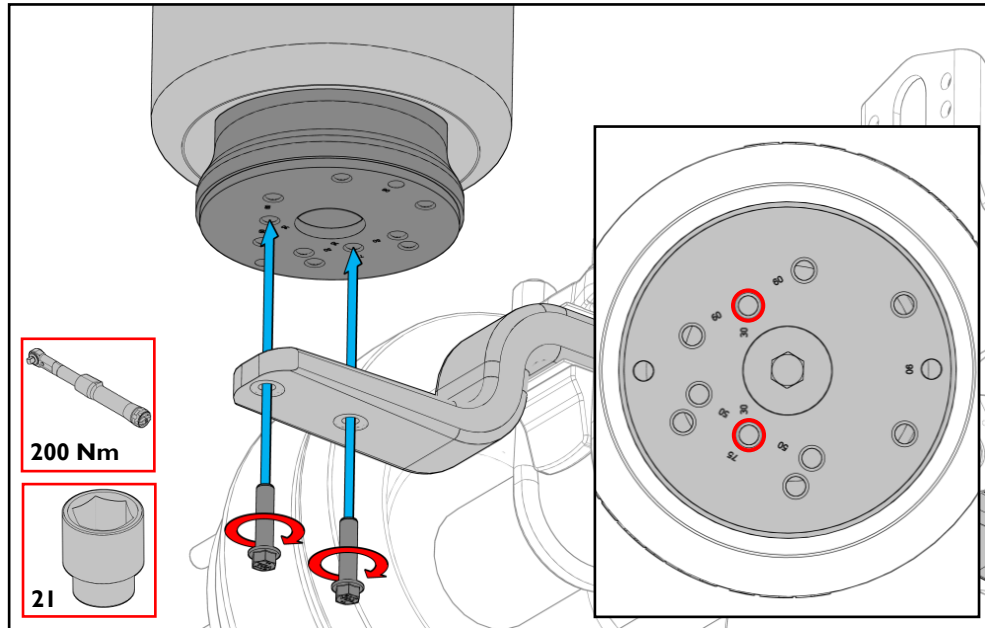
15.9a Air spring Ø350 - Swivel Offset 30mm

Mount the Ø350 air spring with multi-offset swivel piston directly on the trailing arm with the M16 bolts. Tighten to torque according to the instructions.

Make sure to use the correct 30mm offset holes in the piston. See the image on the far right.

After mounting follow **step 15.9f** to align the flexmember to the chassis rail.

See tightening instructions: Section 10



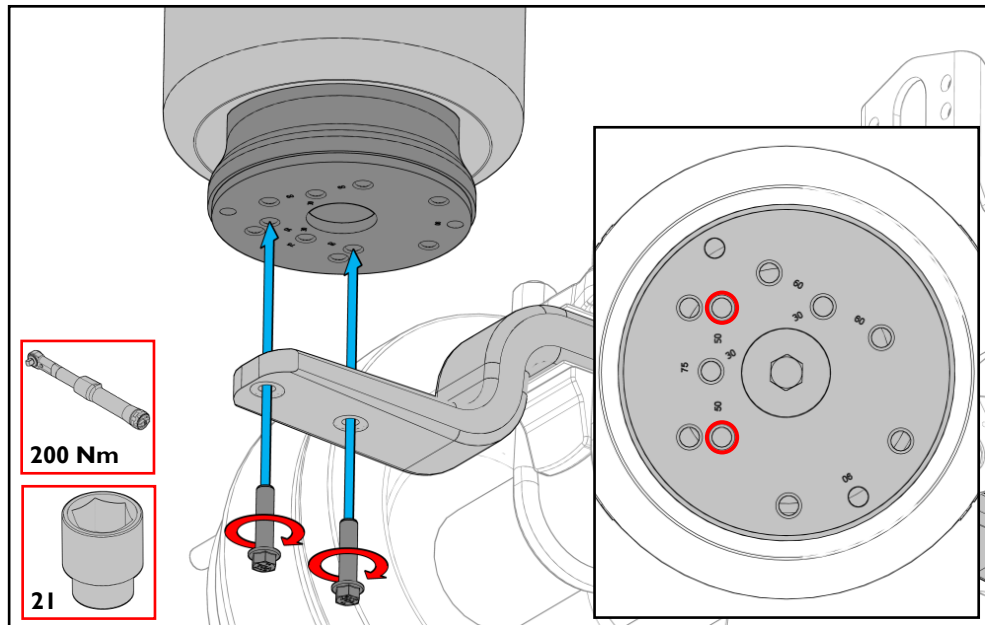
15.9b Air spring Ø350 - Swivel Offset 50mm

Mount the Ø350 air spring with multi-offset swivel piston directly on the trailing arm with the M16 bolts. Tighten to torque according to the instructions.

Make sure to use the correct 50mm offset holes in the piston. See the image on the far right.

After mounting follow **step 15.9f** to align the flexmember to the chassis rail.

See tightening instructions: Section 10



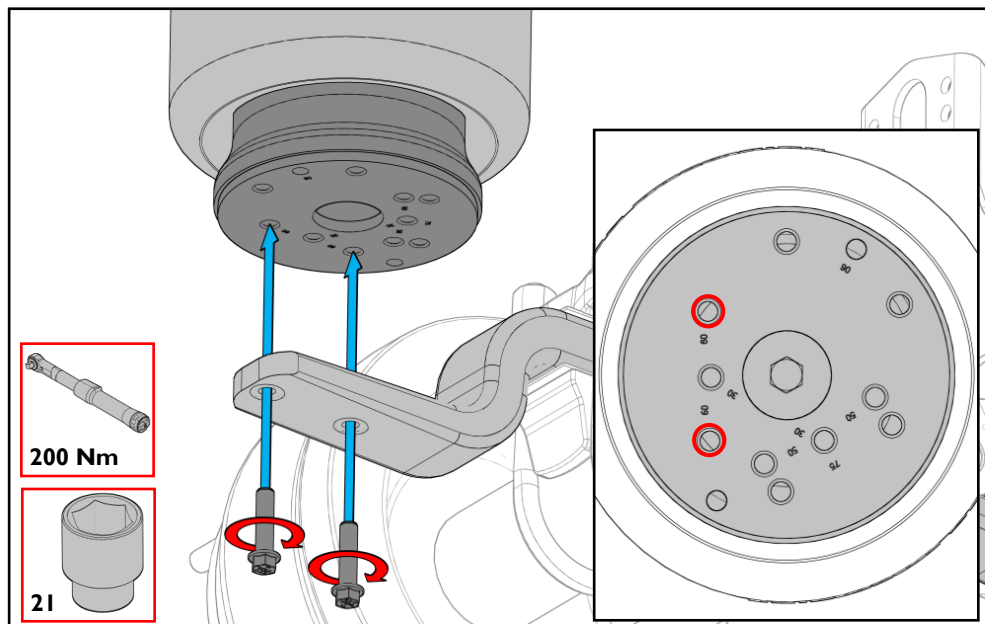
15.9c Air spring Ø350 - Swivel Offset 60mm

Mount the Ø350 air spring with multi-offset swivel piston directly on the trailing arm with the M16 bolts. Tighten to torque according to the instructions.

Make sure to use the correct 60mm offset holes in the piston. See the image on the far right.

After mounting follow **step 15.9f** to align the flexmember to the chassis rail.

See tightening instructions: Section 10



15. Available air spring options

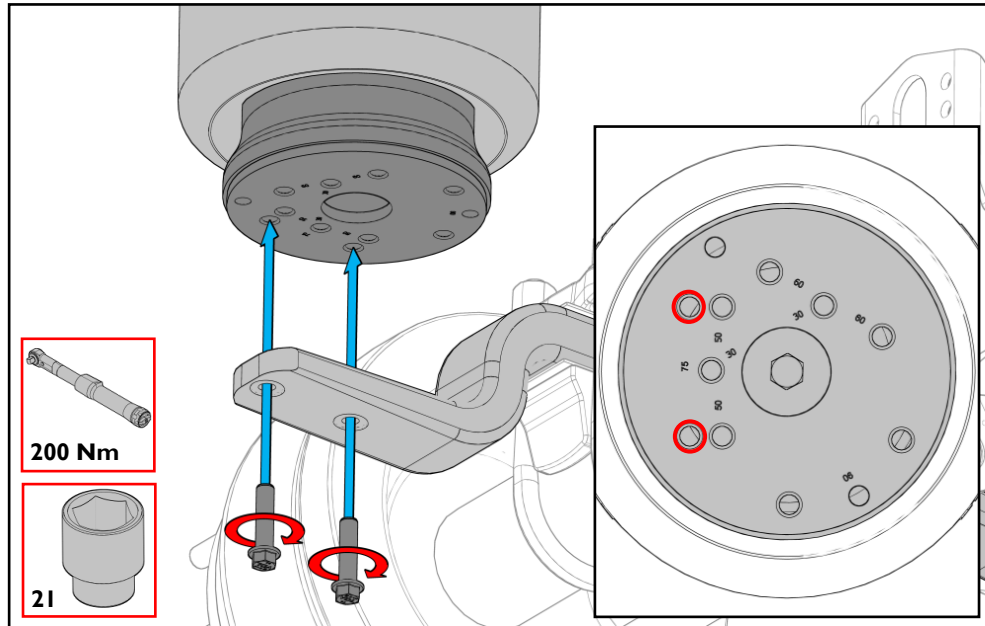
15.9d Air spring Ø350 - Swivel Offset 75mm

Mount the Ø350 air spring with multi-offset swivel piston directly on the trailing arm with the M16 bolts. Tighten to torque according to the instructions.

Make sure to use the correct 75mm offset holes in the piston. See the image on the far right.

After mounting follow **step 15.9f** to align the flexmember to the chassis rail.

See *tightening instructions: Section 10*



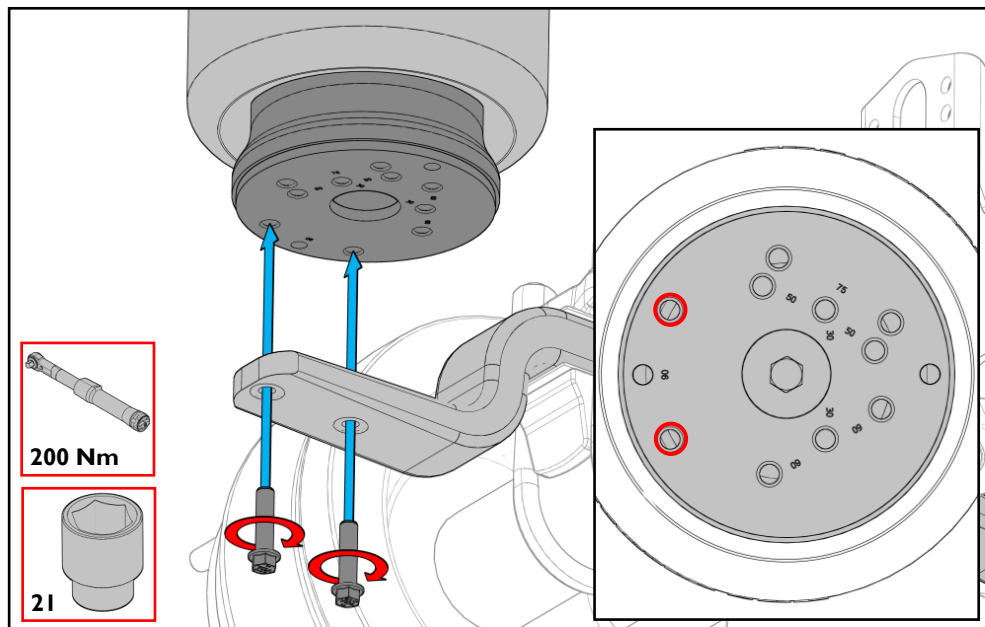
15.9e Air spring Ø350 - Swivel Offset 90mm

Mount the Ø350 air spring with multi-offset swivel piston directly on the trailing arm with the M16 bolts. Tighten to torque according to the instructions.

Make sure to use the correct 90mm offset holes in the piston. See the image on the far right.

After mounting follow **step 15.9f** to align the flexmember to the chassis rail.

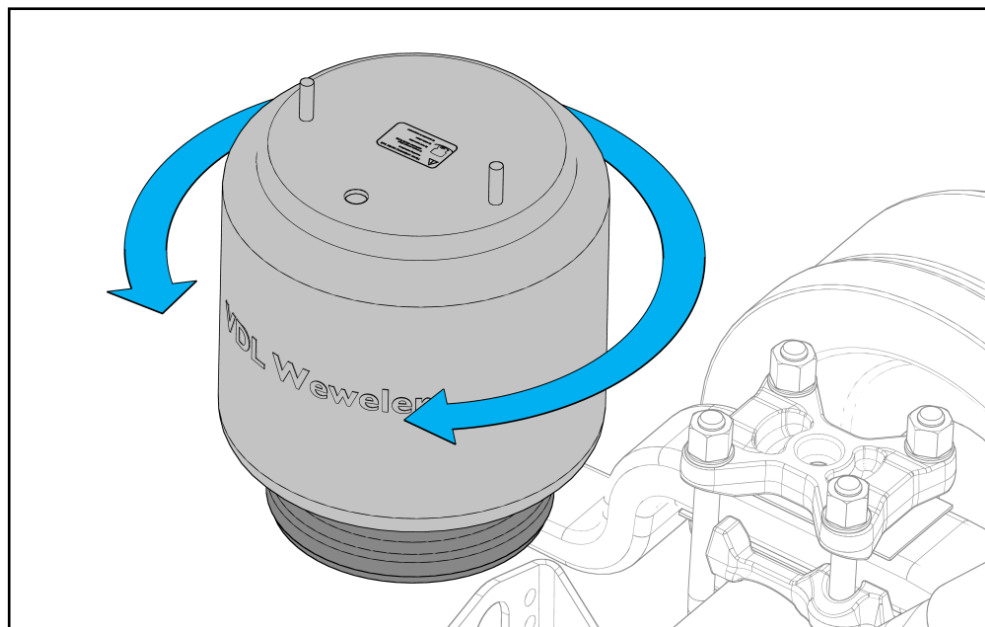
See *tightening instructions: Section 10*



15.9f Air spring Ø350 - Swivel Flexmember alignment

After mounting the Ø350 swivel air spring on the trailing arm the studs on the top bead plate must be aligned to the chassis (depending on the chosen offset). This can be done by lifting up the flexmember slightly and rotate the complete air spring top assembly to the correct position with the air inlet pointing towards the middle of the vehicle. **Never untighten the center piston bolt for this alignment!!**

Finally the air spring can be mounted to the chassis, see step **15.9g**.

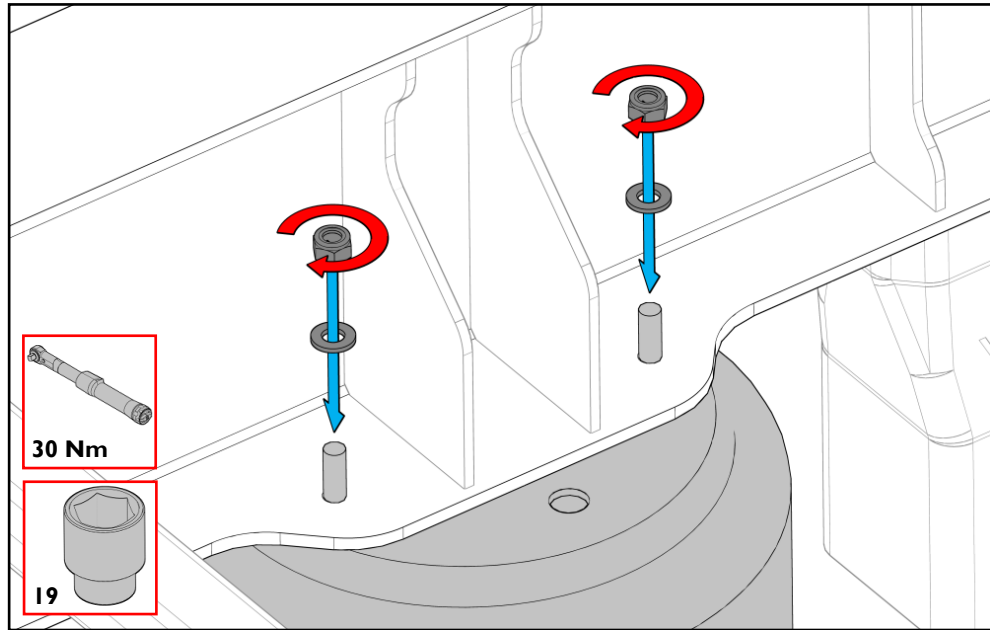


15. Available air spring options

15.9g Air spring to chassis / pedestal

Mount the Ø350 swivel air spring top to the chassis or pedestal. Tighten the (lock)nuts to torque according the instructions.

See tightening instructions: Section 10



16. Rear mounted shock absorber assembly

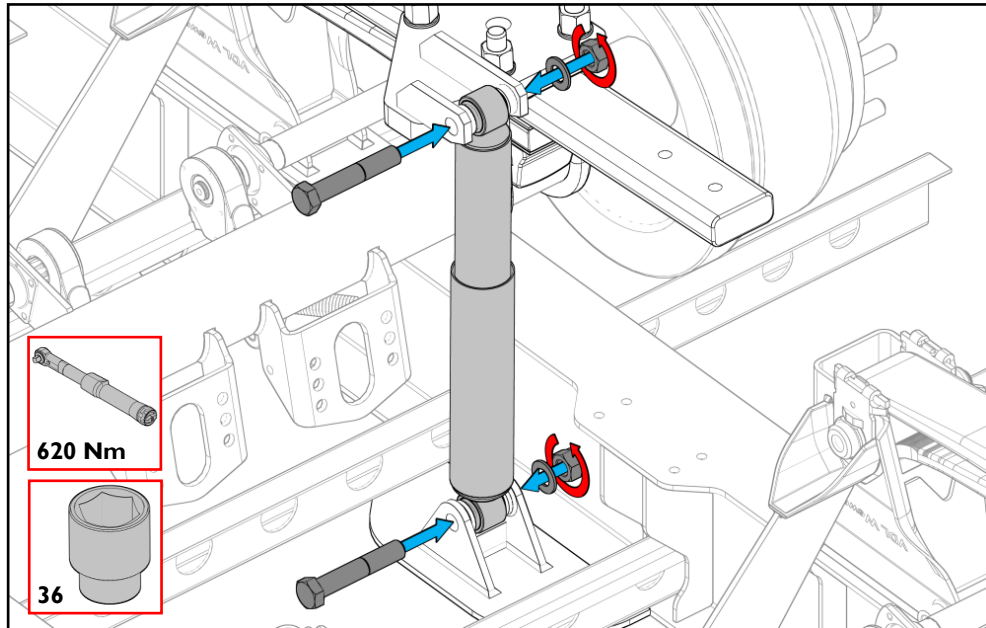
16.1 Rear mounted shock absorber Underslung application

Place the shock absorbers, bolts, nuts and washers. If present, follow the instructions on the shock absorber (see Section 6).

Tighten the top and bottom connection **at ride height** to torque according the instructions.

The trailer builder is responsible for the design of the M24 top connection point in the chassis.

See tightening instructions: Section 10



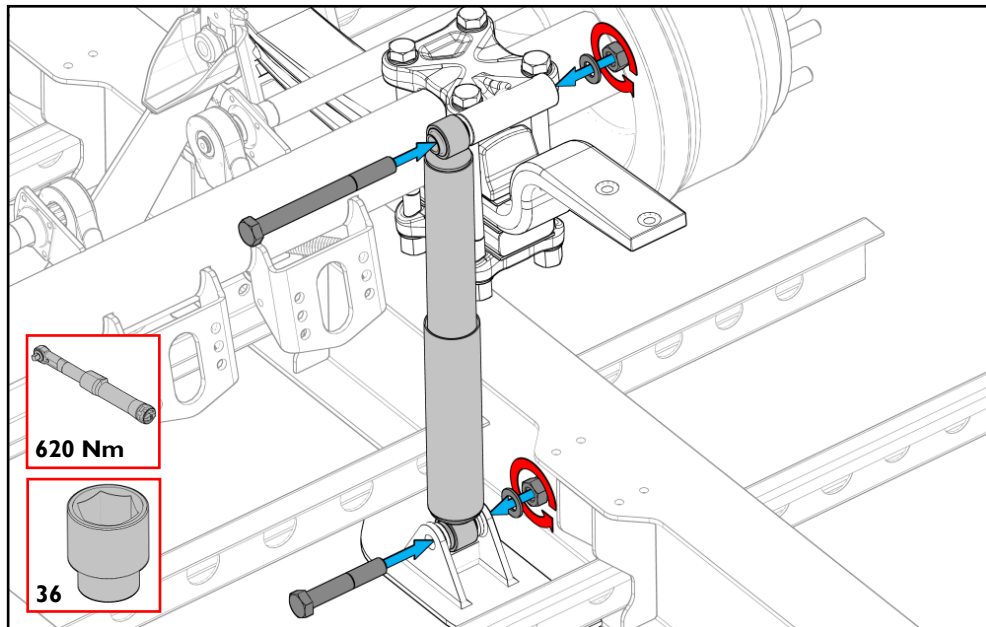
16.2 Rear mounted shock absorber Overslung application

Place the shock absorbers, bolts, nuts and washers. If present, follow the instructions on the shock absorber (see Section 6).

Tighten the top and bottom connection **at ride height** to torque according the instructions.

The trailer builder is responsible for the design of the M24 top connection point in the chassis.

See tightening instructions: Section 10



Notes

A series of horizontal dotted lines for taking notes, spanning the width of the page.