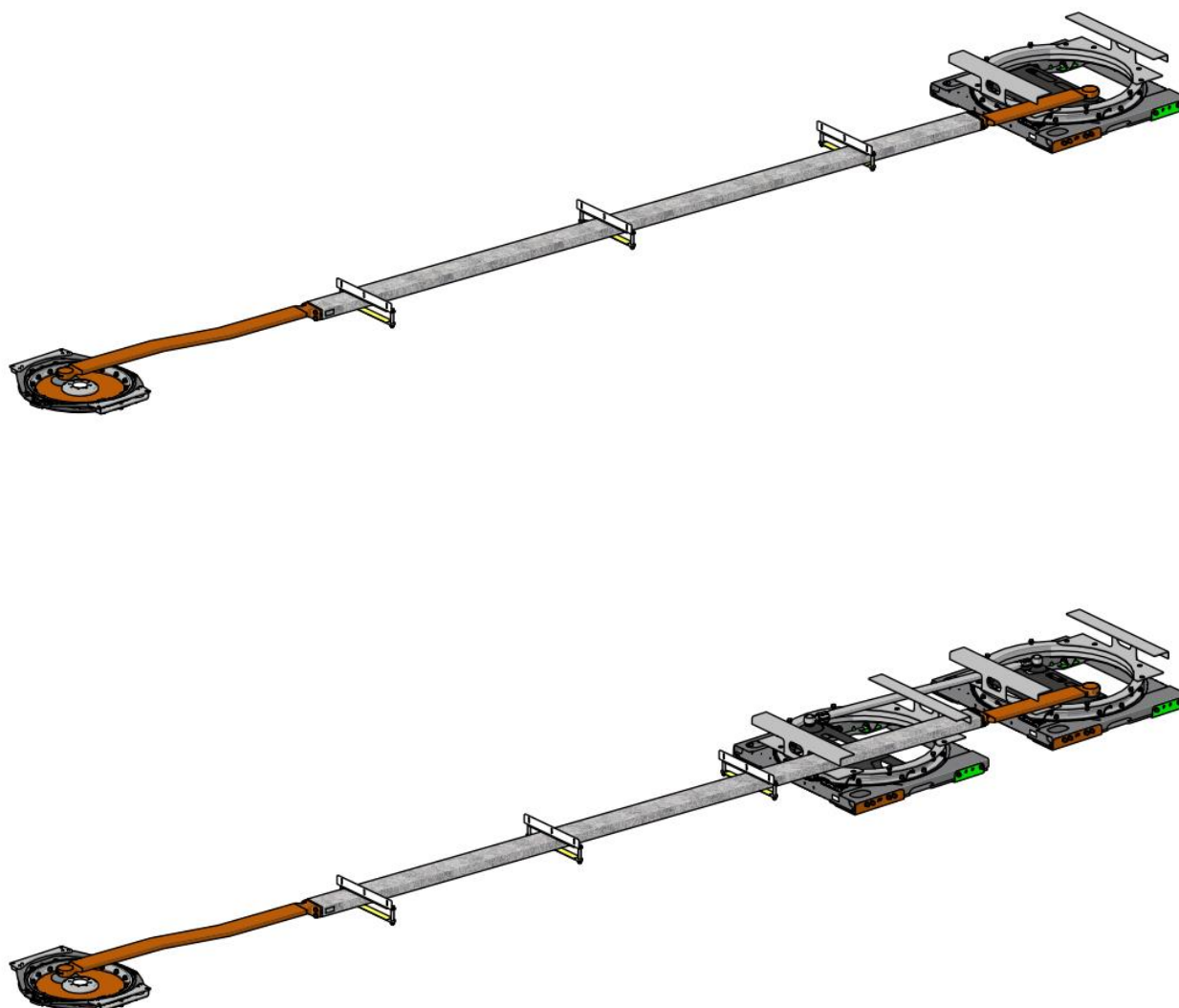


Service Manual

Single Bar Steering System



APPROVED on 14-03-2022

Revision - 02

Subject to change without notice.

Latest version and additional information can be found online at www.group-ims.com

PUBLIC

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1 INTRODUCTION

This service manual contains all necessary information about the service of the single bar steering system for users. The document is intended for everyone who uses and maintain a trailer equipped with a SB steering system.

Note that the drawings and illustrations in this guide are examples only and dimensions depend on the specific configuration of the SB system. Dimensions and configurations may vary depending on the specific needs of the vehicle manufacturer.

Specific dimensions and detailed design data can be obtained from technical documentation like technical drawings or 3D models.

Any modification to the system, in any form whatsoever, could compromise the safety of the system. The systems warranty and type approval certificates are rendered invalids if our products are modified without written approval from IMS.

1.1 Type identification

Three type plates are fixed to each steering system unit. The type plates are fixed on; under the front unit, left side of the steering bar middle tube and the front side on the rear unit.

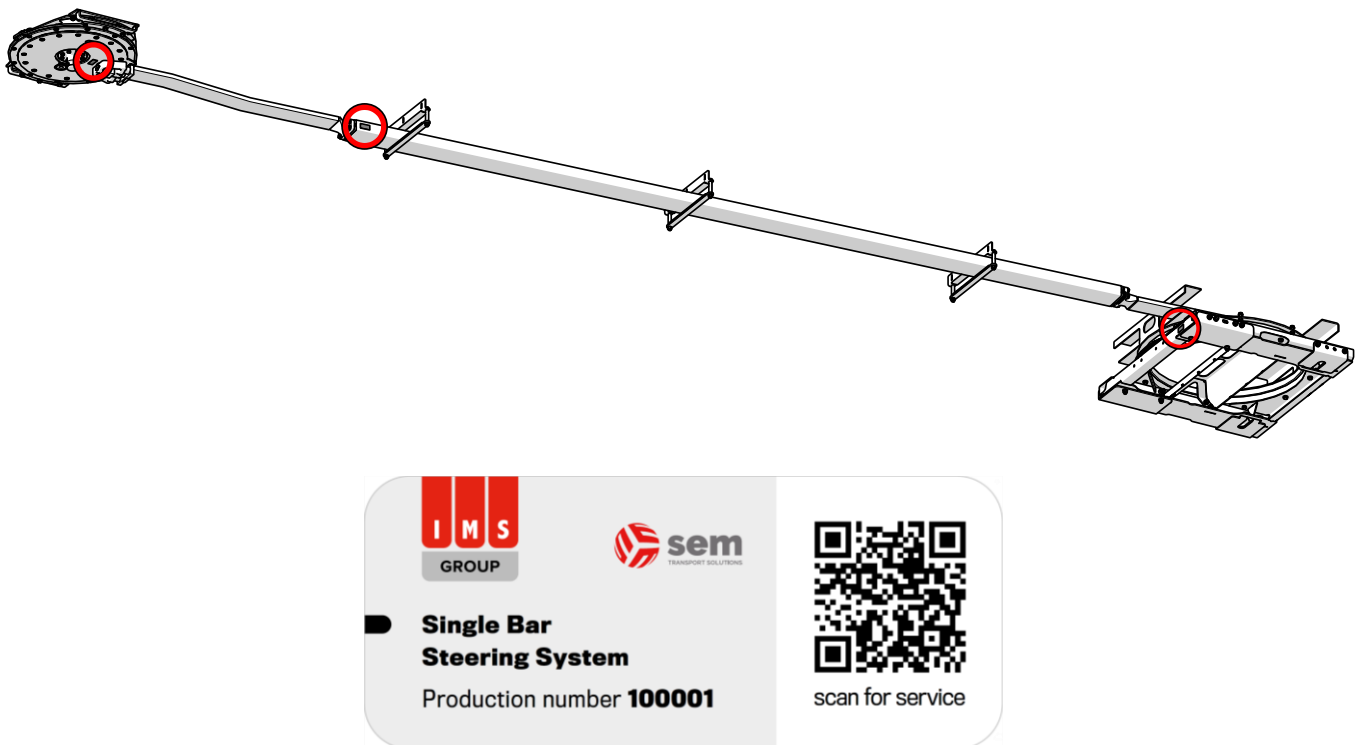


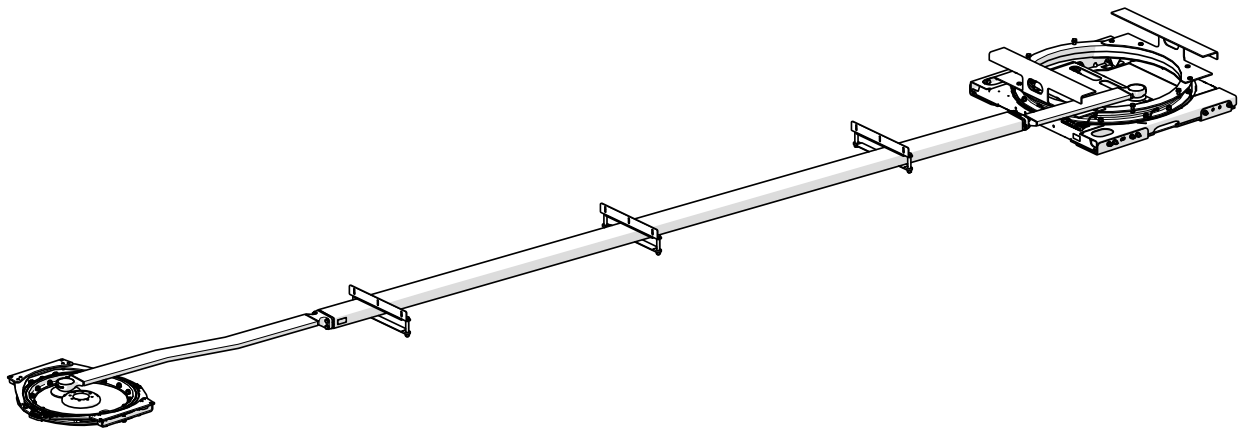
Figure 1: Example type plate

The following data is shown on the type plate:

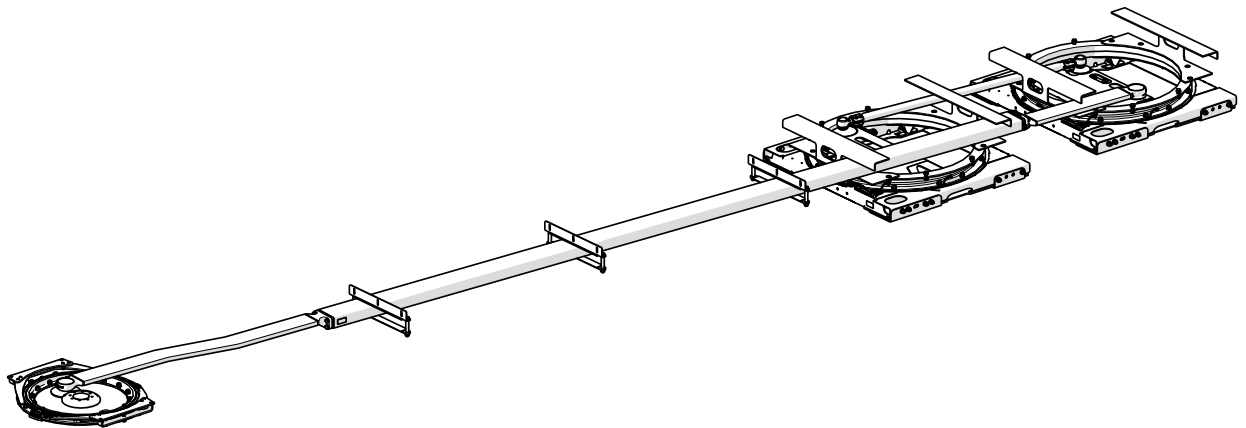
Field	Description	Example
Unit type	The system identification	Single Bar Steering System
Production number	Production number of the system	100001
QR code	A QR code to find more about service and warranty	

1.2 Overview of the systems

System to steer 1 axle; named SB1








System to steer 2 axles; named SB2



1.3 Symbols

In this manual, the following symbols are used:

Symbol	Description
	Read this information first!
	Important restriction!
	Danger for injury or life threatening situation! Important remark
	Danger for clamping!
	Danger of falling object!

2 SAFETY AND ENVIRONMENT

2.1 Safety regulations

- The service of the SB system must be done by qualified and experienced personnel.
- The trailer must be prevented from moving during installation or repair work. Please observe the relevant safety regulations for installation and/or repair work on commercial vehicles. This holds particularly true for jacking up and securing the vehicle.
- For all welding operations, sensitive parts must be protected against sparks and weld spatter. This holds particularly true for the air-bags, shock absorbers, pneumatic lines, electrical wires, wheel hub and fastener threads.
- Remove the negative connector from the battery before welding process.
- Always wear protective clothing (gloves, safety boots, safety goggles, etc.) and only use recommended tools.
- A second technician must provide assistance when carrying out work with heavy components.
- All air lines must be depressurized before components are being removed.
- Following the installation or service, perform a function check of a test drive in order to make sure that suspension and brakes are functioning correct. New brake linings only have maximum brake performance after a few braking actions.
- Oil, grease, hydraulic fluids and batteries can contaminate the environment. Follow the correct procedures for the recycling of these substances.
- Use only SEM parts or IMS approved parts.
- Tighten all fasteners to the recommended tightening torques using a calibrated torque wrench.
- Do not mount any underride protection onto the rear unit.



3 TURNABLES

3.1 Manual lubrication

A **SB1** steering system is provided with 2 turntables.

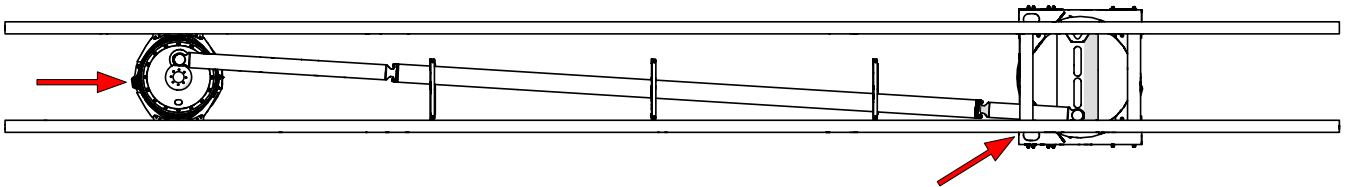
A **SB2** steering system is provided with 3 turntables.

There is one turntable in the module at the kingpin and one above each steered axle. The turntables have been provided with high quality grease (Lithium, extreme pressure grease, NLGI class 2). Certain conditions to guarantee a longer lifespan include:

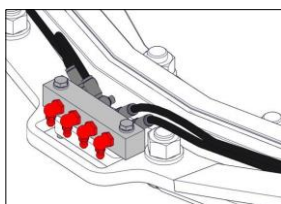
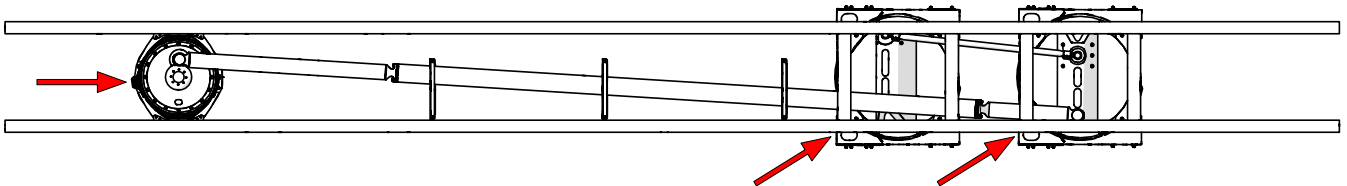
- The rubber seals must not be damaged.
- The vehicle must not be cleaned with a high-pressure cleaner near the turntables.
- The vehicle must not be used in extraordinary circumstances.

3.1.1 Lubrication points - Manual Lubrication without central lubrication points at the steering axles

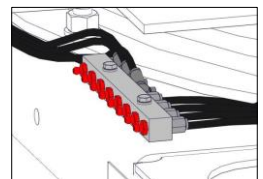
SB1



SB2



Front Unit



Rear Unit



The central lubrication of the turntables in the rear unit is usually assembled on the front (left or right) of the rear unit, depending on the constructor.



The lubrication point on the steering wedge should always be lubricated manually, also for central lubrication.

3.1.2 Lubrication instruction

- Visually check whether all lubricant pipes are still in good condition (not bent, properly connected, etc.). Also visually check the turntables for visible damage that could lead to the poorly functioning of the system.
- Disconnect the trailer and make sure the wheels of the steered axle come off the ground.
- Turn the turntables during lubrication (with a lever between kingpin and steering wedge), by turning the front turntables +/-45° back and forth to ensure that each zone of the turntables is filled with the grease and spreads evenly.
- Lubricate the turntables with Lithium, extreme pressure lubrication grease, NLGI class 2!
- When lubricating, make sure that the grease spreads evenly in each turntables. The lubrication nipples must all be properly accessible and cleaned.

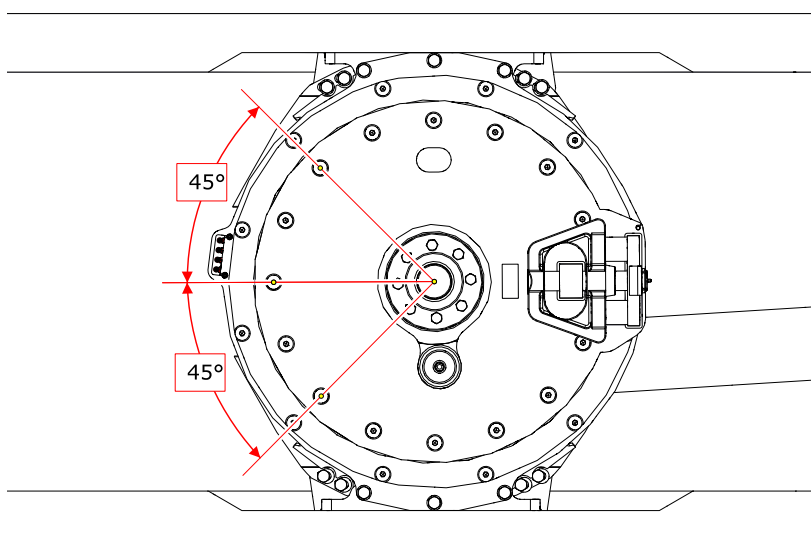


Table 1 lubricants

ARAL	Aralub HLP2	(-30°C to +120°C)
CASTROL	Spheerol EPL2	(-10°C to +140°C)
KLÜBER	Centoplex EP2	(-20°C to +130°C)
LUBRITECH	Lagermeister EP2	(-20°C to +130°C)
MOBIL	Mobilux EP2	(-20°C to +130°C)
SHELL	Gadus S2 V220 2	(-25°C to +130°C)
TOTAL	Multis EP2	(-25°C to +120°C)

- The types of grease mentioned in Table 1 have been released for large roller bearings and tested in view of compatibility with the materials used for spacers and gaskets.
- The lubricant list isn't necessarily complete.
- When using other lubricants, the lubricant manufacturer must confirm that the lubricant in question is appropriate. The properties must at least correspond to the types of grease mentioned in Table 1. And the compatibility with the materials we use must be guaranteed.
- When using other lubricants, the lubricant manufacturer must confirm that the lubricant in question is appropriate.
- Special lubricants need to be used in low temperatures.
- Lubricants form a threat for the environment. They may not end up in the soil and/or in groundwater or in the sewer system.






3.1.3 Greasing intervals

The turntables must be fully lubricated every three months or after cleaning with a high pressure cleaner as described above.

The turntables require extra lubrication if the turntables are used in extreme circumstances such as:

- In very dusty or humid environments
- On routes where a lot of salt is scattered
- When cleaning with more intensive or abrasive products

When used in these circumstances, the lubrication interval must be shortened. In extremely cold circumstances where the types of grease mentioned do not suffice, an alternative must be decided in consultation with the lubricants manufacturer which the grease mentioned has to meet.



	Specific questions relating to the lubricants should be discussed with the lubrication manufacturer.
	Optimum use of the right lubricants and correct intervals prolong the lifespan of the Single Bar steering system.
	Do not mix different types of grease.
	Proper lubrication is an absolute must for the loop system of the turntables. Only this way a satisfactory useful life can be achieved.
	Only use grease from table 1. If using others, contact IMS

3.2 Automatic lubrication

Both the lubrication points of the turntables of the kingpin module and the lubrication points of turntables above the steering axles can easily be connected to an automatic lubrication system.

3.2.1 Instruction

- Visually check whether all lubricant pipes are still in good condition (not bent, properly connected, etc.). Also visually check the turntables for visible damage that could lead to the poorly functioning of the system.
- Make sure that high quality grease is always used (Lithium, extreme pressure lubrication grease, NLGI class 2) and that the reservoir is always sufficiently filled. Always follow the instructions of the supplier for the maintenance of the central lubrication system, so proper operation is always guaranteed.

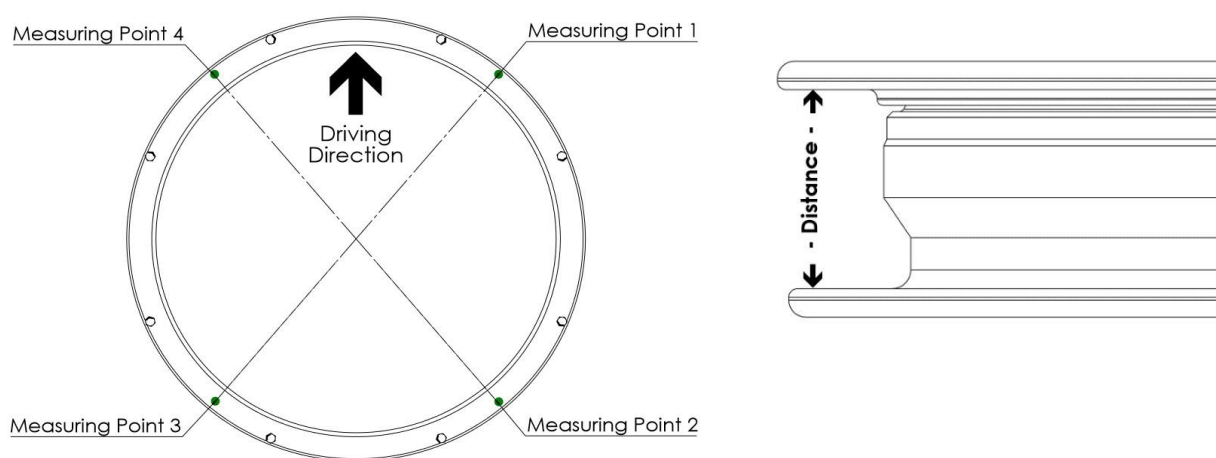
	Do not mix different types of grease.
	Proper lubrication is an absolute must for the loop system of the turntables. Only this way a satisfactory useful life can be achieved.

4 TURNABLE BEARING PLAY CHECK-UP

For a proper operation of the steering system it is important that there is not too much play on the turntables. This is why turntables should be checked for play. If a control system is assembled on the turntables, then never drive on if it indicates that the wear has become too great.

4.1 Instruction

- Disconnect the trailer.
- Check the screw connections of the turntables and tightening torques (also see chapter 6, 'Bolts and nuts').
- With a dial indicator or slide gauge measure the distance between the flanges on four points near a bolt/nut connection. Add up the four sizes measured and divide this sum by four to calculate the average size. Note down this average size.
- Measuring the play for the turntables at a steering axle



- Lift the superstructure of the trailer so the wheels come off the ground.
- Measure the distance between the flanges at these four points again and note down the four measured sizes. Also add up these four sizes measured and divide the sum by four to calculate the average size. Also note down this average size.
- Calculate the difference between the two average sizes.
- This difference indicates the play of this turntables. Inspection bodies recommend a maximum play of 3 mm. If the calculated play between the two flanges of one turntables is more than 3 mm, it is recommended to replace this turntable.
- Damaged parts must always be replaced by new parts.

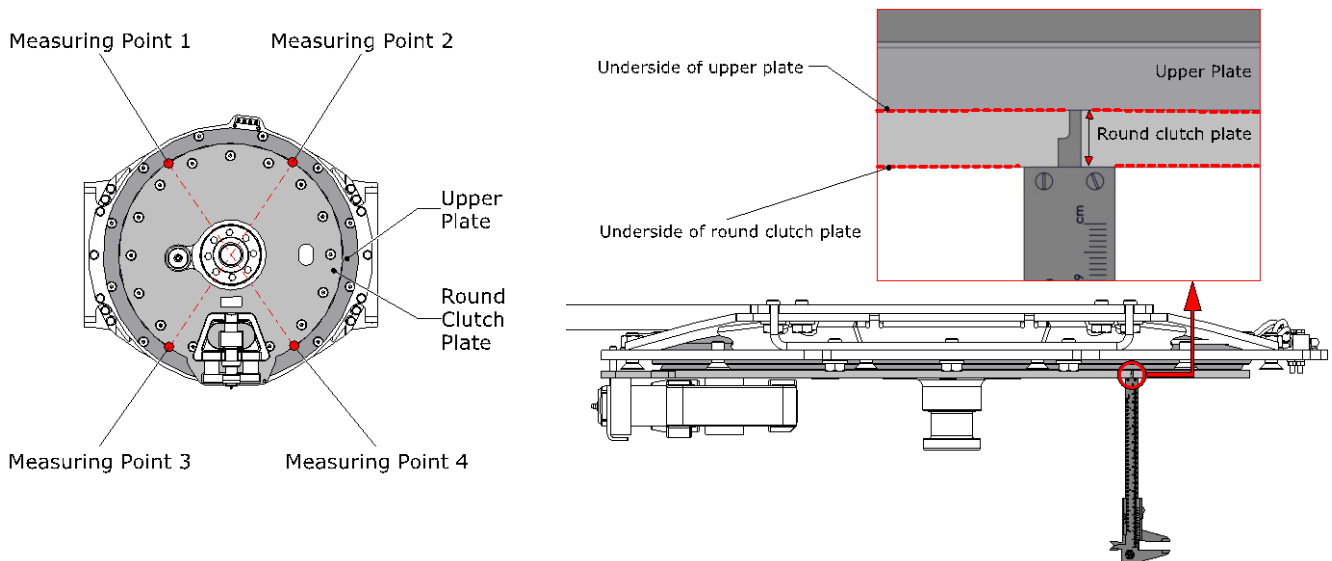
5 FRONT MODULE BEARING PLAY CHECK-UP

The turntable in the kingpin module must be checked annually for excessive play.

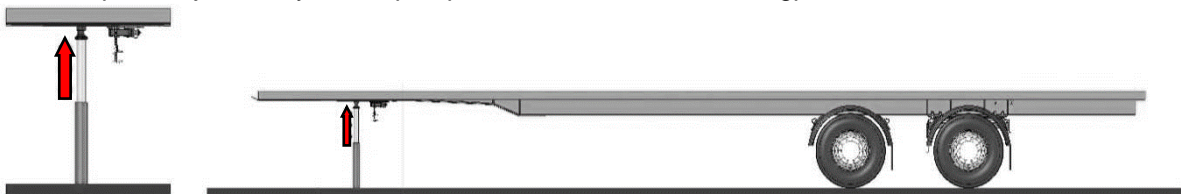
5.1 Instruction

- Disconnect the trailer and block the wheels.
- Check the screw connections of the turntables during tightening torques (see chapter 6, Bolts and nuts).
- Using a slide gauge, measure the distance between the round clutch plate and the underside of the upper plate of the module at four points. Calculate the average of these four sizes and note down.

Measuring the play of the turntables in the kingpin module



- Then place a jack or hydraulic pump under the center of the kingpin.



- Push the kingpin up with a force of 75 kg.
- Again measure the distance between the underside of the round clutch plate and the underside of the upper plate of the kingpin module at four points. Calculate the average of these four sizes and note down.
- Calculate the difference between the two average sizes.
- This difference indicates the play of this turntables. Inspection bodies recommend a maximum play of 3 mm. If the calculated play between the two flanges of one turntables is more than 3 mm, it is recommended to replace the turntables.
- Damaged parts must always be replaced by new parts.

5.2 Inspection periods

Turntables should be checked for play annually.



Never grind or weld a turntables, this can lead to serious damage and safety risks.

6 BOLTS AND NUTS

6.1 Checking and tightening the bolts and nuts

It's important that all bolts remain at the right initial torque. All bolt connections have self-locking nuts, but as these connections are critical for a safe operation of the system, it must be guaranteed that bolt and nut connections are always attached with the right tightening torque. Based on practical experiences and to compensate for possible flexibility in the trailer, it's possible that a bolt connection loses the necessary initial torque during the first weeks of use. This is why the connection must be tightened once and then checked annually according to the instructions described below.

A visual inspection suffices to check whether any bolt connections have loosened.

Use thread-locking fluid (Loctite) for ensuring a reliable bolt connection for every bolt connection.

6.2 Instruction

Always carry out a visual inspection of all bolt connections to see whether there is any damage that could lead to the improper functioning of the system. The bolt connections that need to be tightened are indicated on the drawings below.

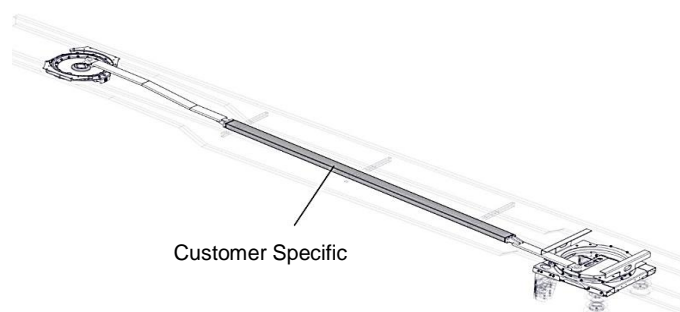


A second technician must provide assistance when carrying out work with heavy components.



During the assembly processes be careful for moving / rotating objects such as turn tables and always wear protective clothing (gloves, safety boots, safety goggles, etc.)

6.2.1 Bolts of steering bar

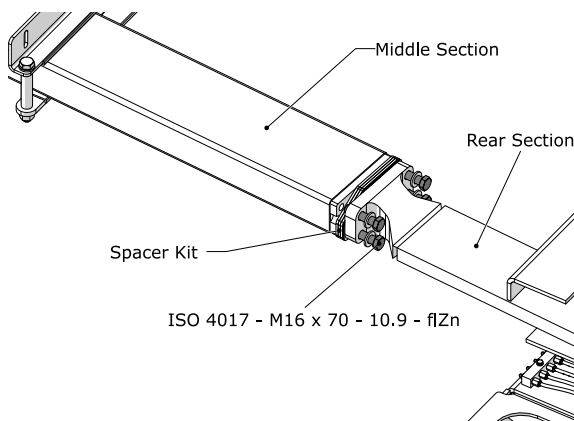
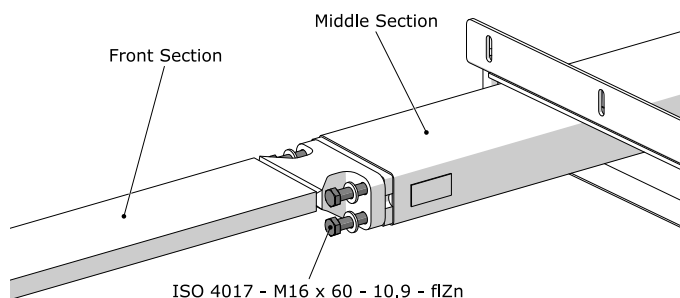
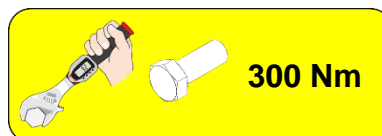


Replace bolts if loose or damaged

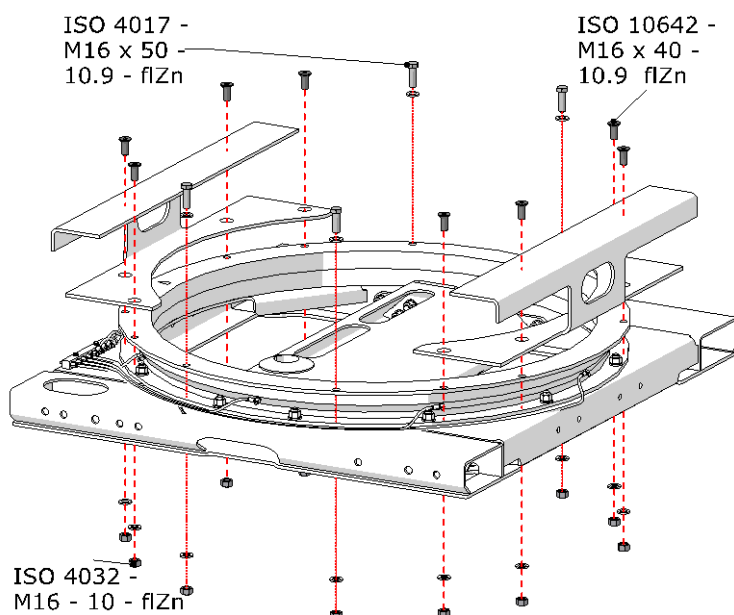
4 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 60 - 10.9 - flZn
(Front side of middle section)

4 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 70 - 10.9 - flZn
(Rear side of middle section, spacer kit side)

Fastener kit: A000418



6.2.2 Bolts of rear unit turntable



Replace bolts if loose or damaged

For I beam flanges thinner than 12mm use;

4 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 50 - 10.9 - flZn

For I beam flanges thicker than 12mm use;

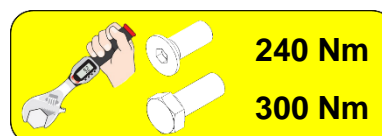
4 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 60 - 10.9 - flZn

8 x Hexagon socket countersunk head screw
ISO 10642 - M16 x 40 - 10.9 – flZn

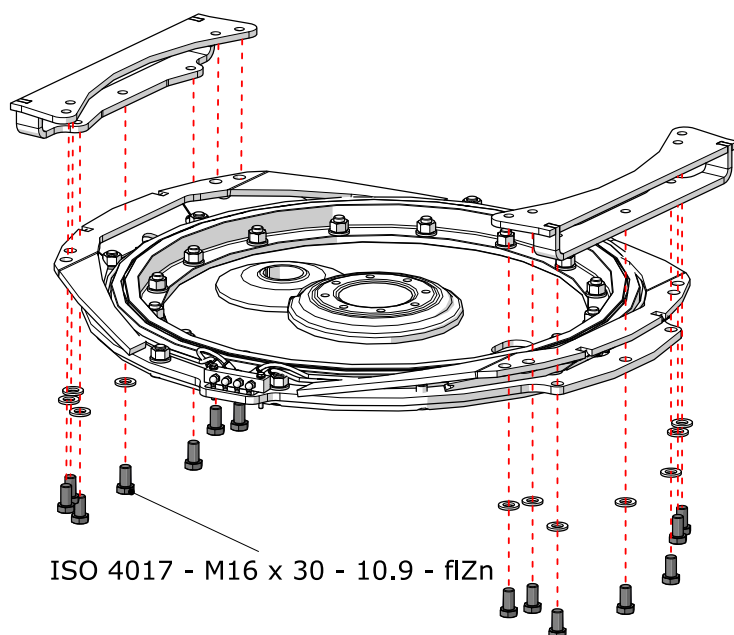
12 x Hexagon nut with metric coarse pitch
thread ISO 4032 - M16 - 10 - flZn

Fastener kit: A000412

**For I beams flanges thicker than 12mm use
Fastener kit: A000722**



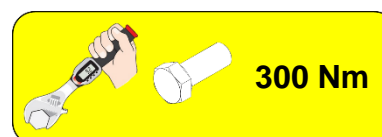
6.2.3 Bolts of front unit FU 960 / 980 16T 90H bolted



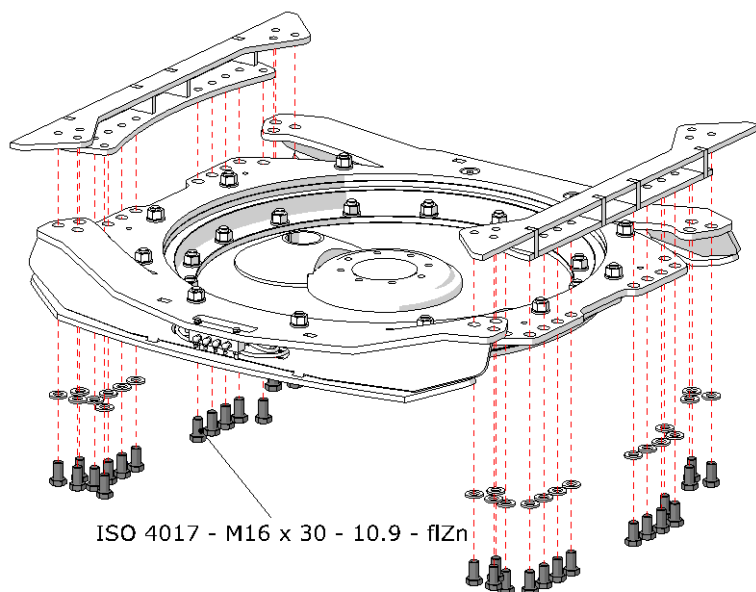
Replace bolts if loose or damaged

14 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 30 - 10.9 – flZn

Fastener kit: A000437



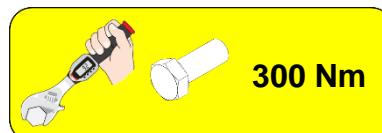
6.2.4 Bolts of front unit FU 960 / 980 20T 135H bolted



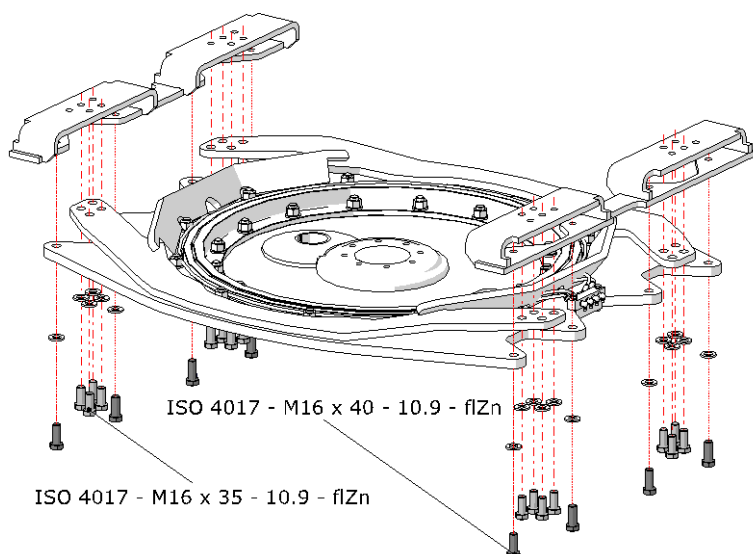
Replace bolts if loose or damaged

32 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 30 - 10.9 – flZn

Fastener kit: A000876



6.2.5 Bolts of front unit FU 1200 13T / 16T 105H bolted

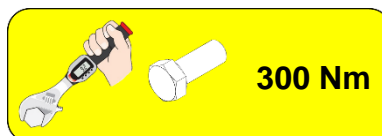


Replace bolts if loose or damaged

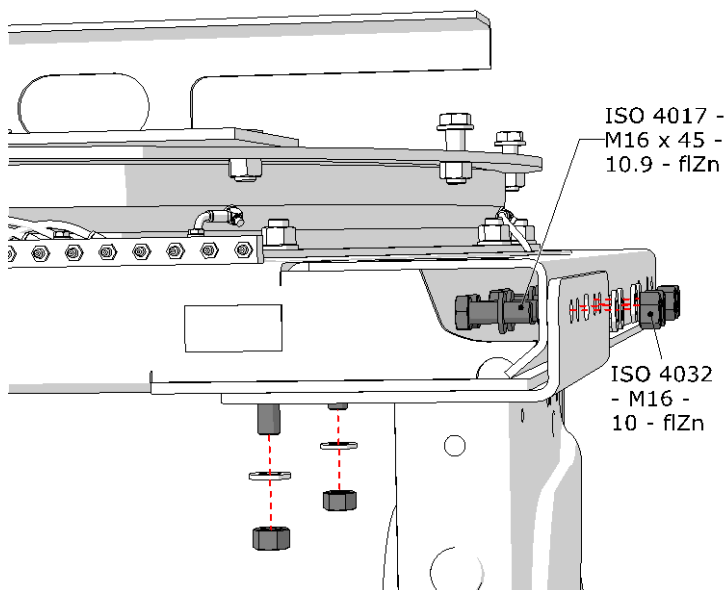
8 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 40 - 10.9 – flZn

16 x Hexagonal head bolt with full tread
ISO 4017 - M16 x 35 - 10.9 – flZn

Fastener kit: A000409



6.2.6 Bolts of hanger brackets

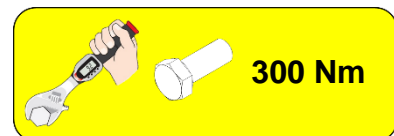


Replace bolts if loose or damaged

6* x Hexagonal head bolt with full tread
ISO 4017 - M16 x 45 - 10.9 – flZn

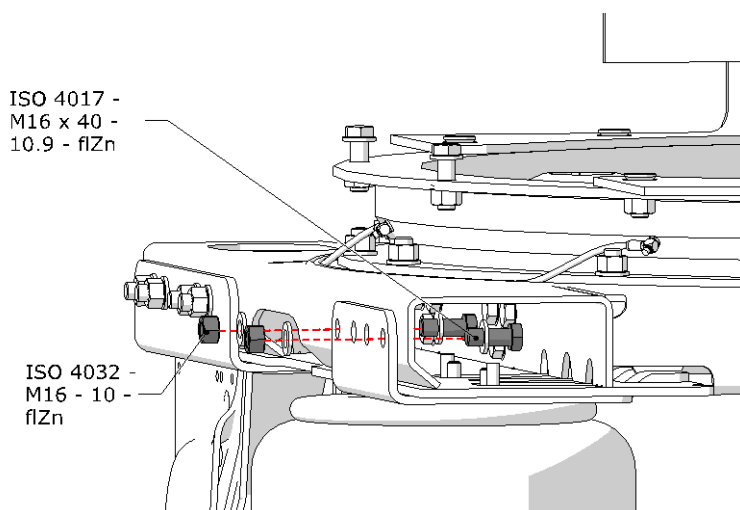
6* x Hexagon nut with metric coarse pitch
thread
ISO 4032 - M16 - 10 - flZn

Fastener kit: A000427 x 2 (per rear unit)



*Quantities are per bracket

6.2.7 Bolts of air spring brackets

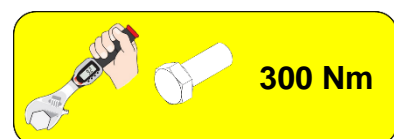


Replace bolts if loose or damaged

2* x Hexagonal head bolt with full tread
ISO 4017 - M16 x 45 - 10.9 – flZn

2* x Hexagon nut with metric coarse pitch
thread
ISO 4032 - M16 - 10 - flZn

Fastener kit: A000428 x 1 (per rear unit)



*Quantities are per bracket

6.3 Inspection periods

The bolts must be checked for the first time within three months after initial use.

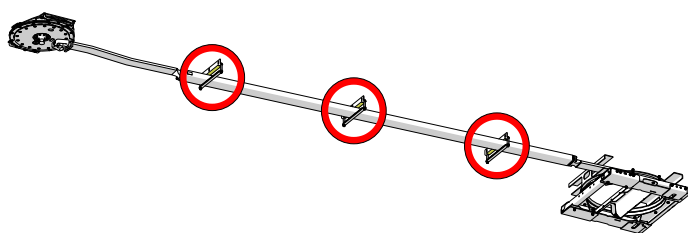


Lock nuts that loosen must be replaced by a new lock nut immediately. If several bolt connections loosen, it is recommended to replace all bolts and nuts of the bolt connection in question.

7 STEERING BAR

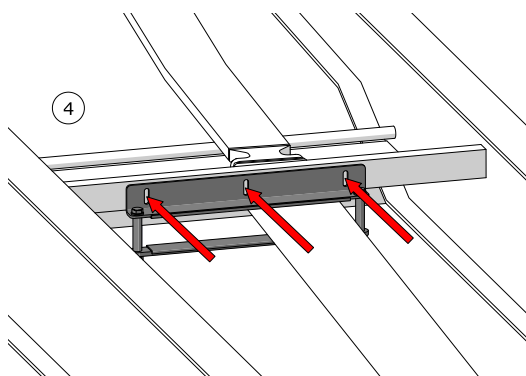
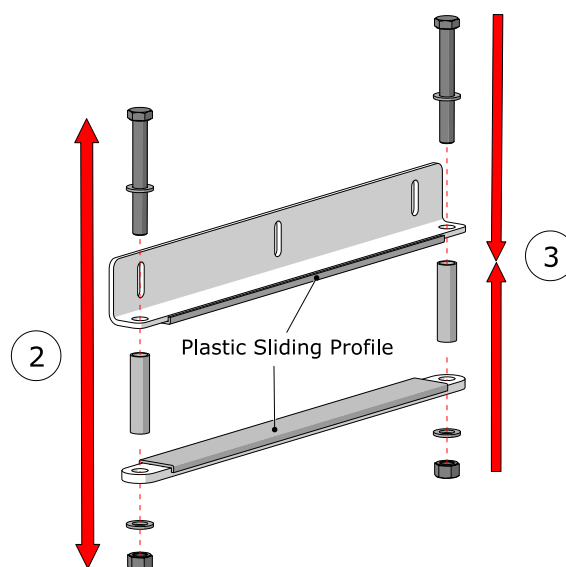
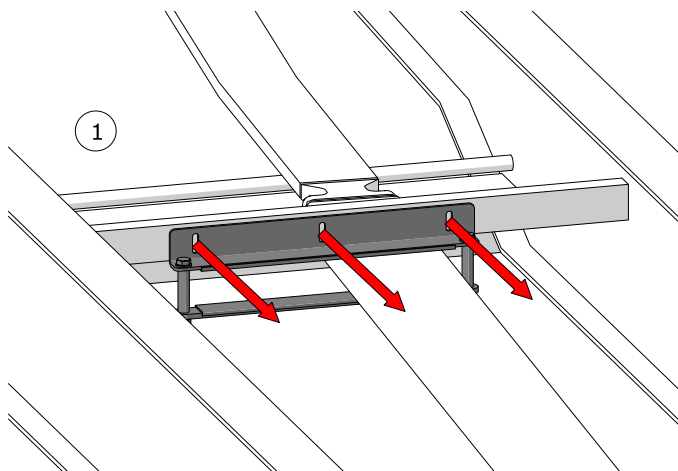
7.1 Check steering rod supports

If steering rods supports are worn out, replace them:



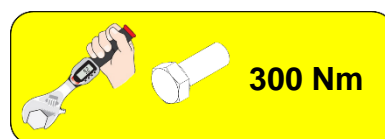
The steering bar support brackets provide support for the steering bar. It is important that the steering bar can move freely in all positions except downwards, where it must be supported by the brackets.

Fix the steering beam brackets by opening the top and bottom parts, placing them over the steering beam and fixing them.



Fastener kit: A000828

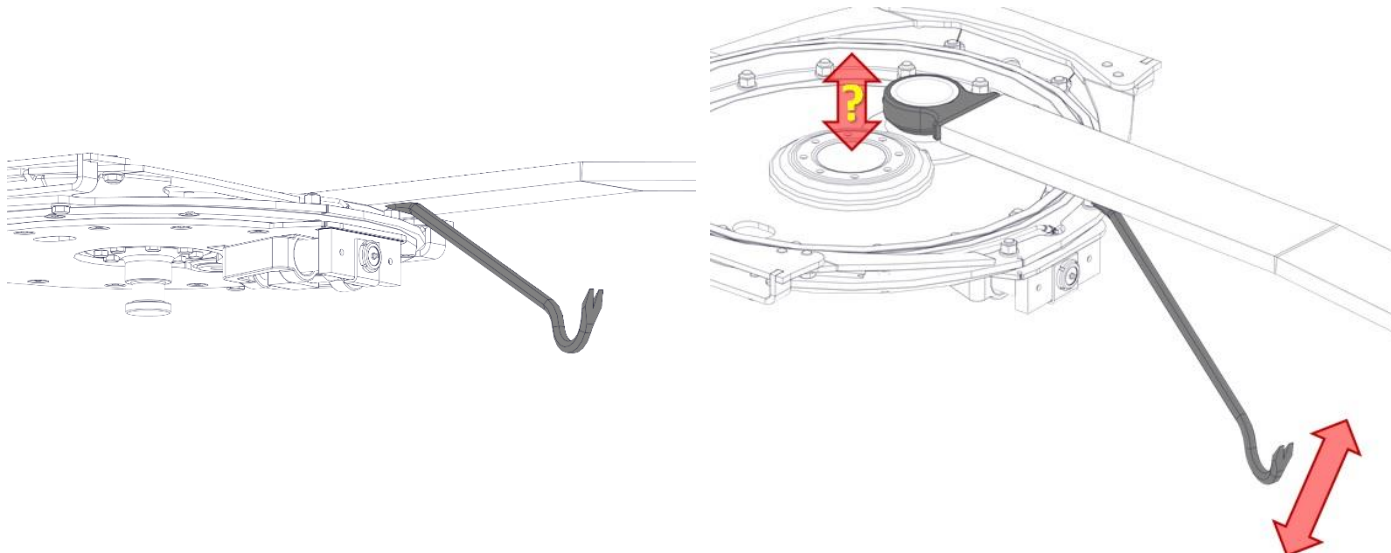
Plastic Sliding Profile: A000824



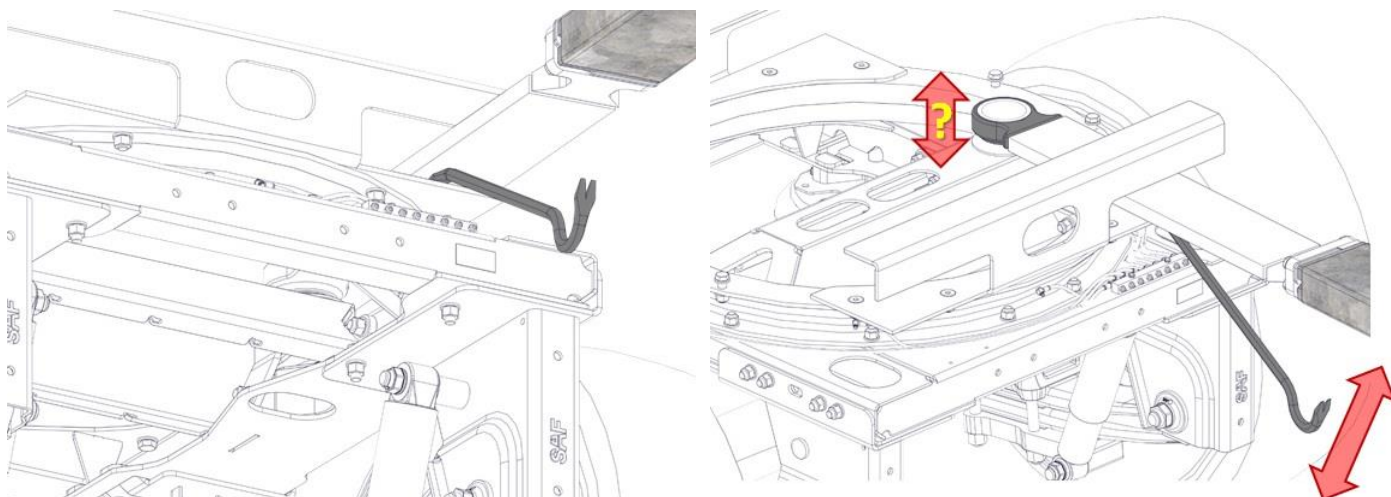
7.2 Spherical bearing check-up

Try to have move vertically the connection point of the steering bar. If it's excessively moving goto 7.3.

Front section of the steering bar

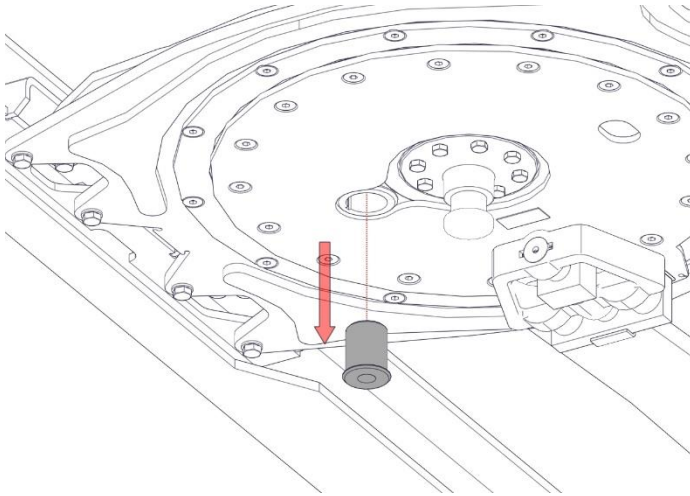


Rear section of the steering bar

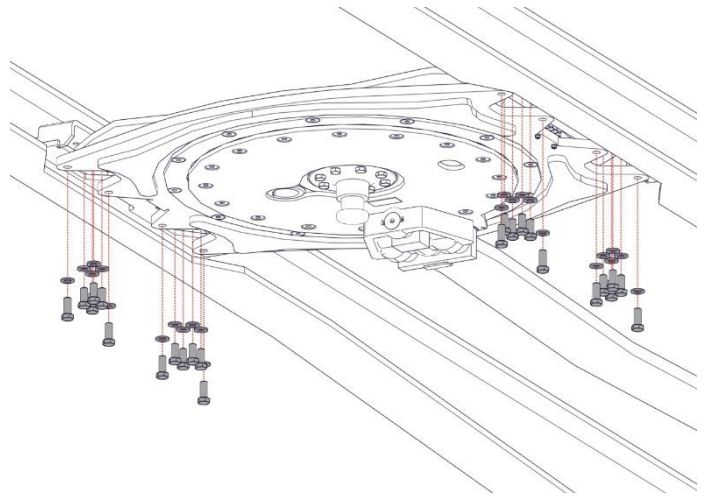


7.3 Spherical bearing replacement

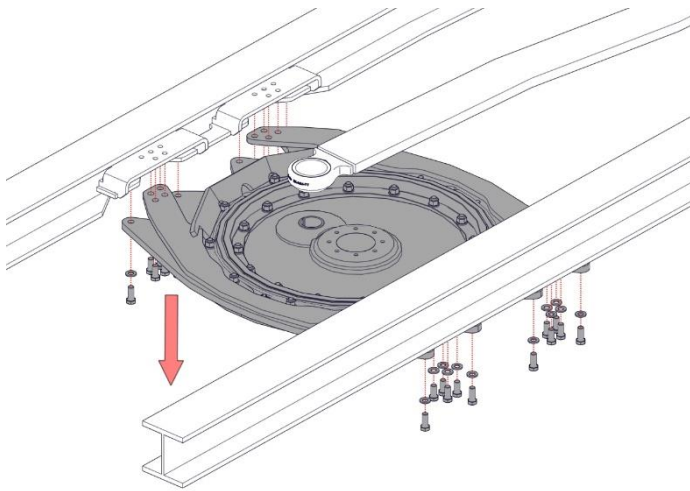
Step 1: Remove the front bar pin



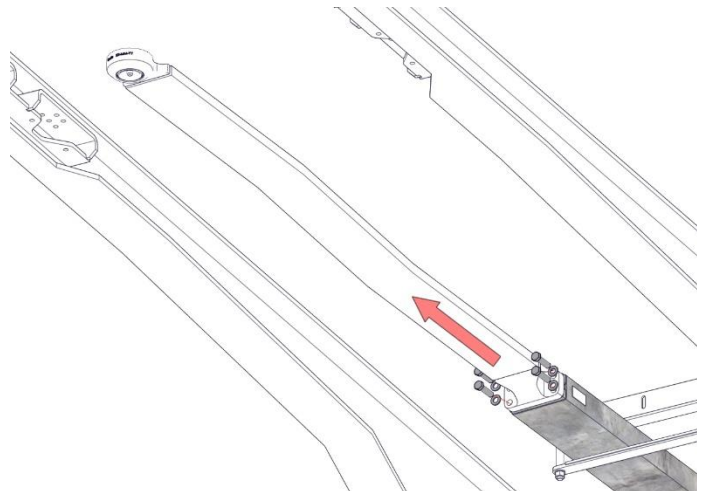
Step 2: Remove the fastener kit



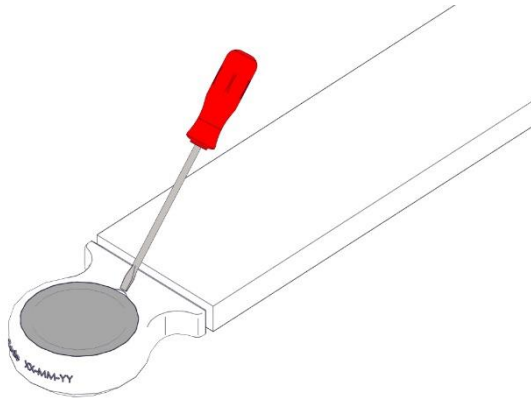
Step 3: Remove front unit



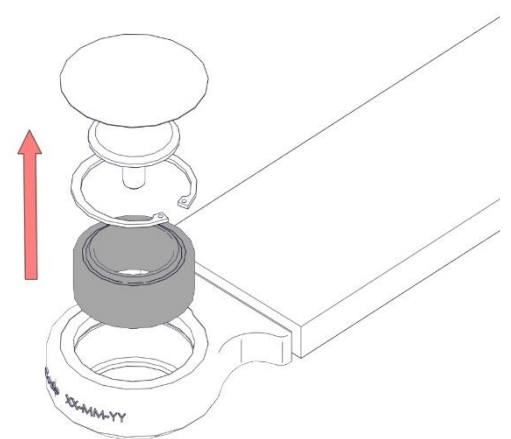
Step 4: Remove front section of the steering bar



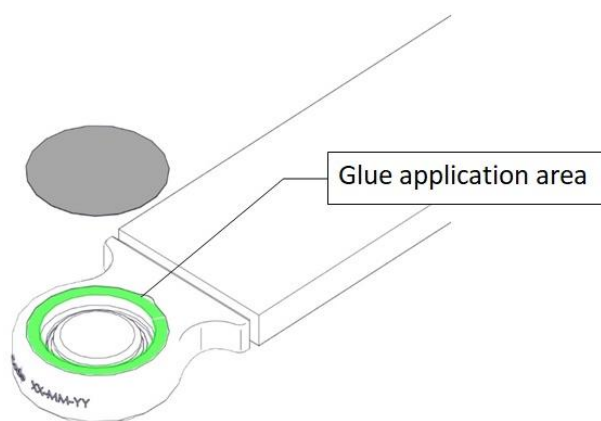
Step 5: Remove bearing house cover



Step 6: Replace the bearing

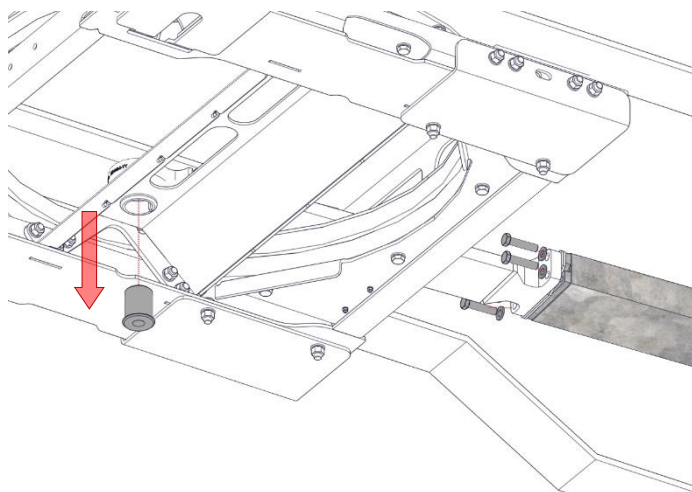


Step 7: Close the cover

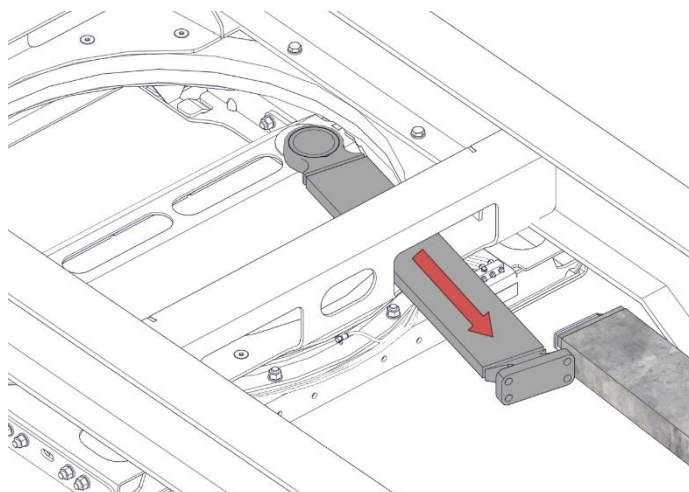


- Clean up glue residue
- Apply the glue so that there are no gaps
- Replace the deformed cover while disassembling it with a new one.
- The glue type: Universal metal-to-metal glue

Step 8: Remove the rear bar pin



Step 9: Remove rear section of the steering bar.
Then reply the step 5, 6 and 7.

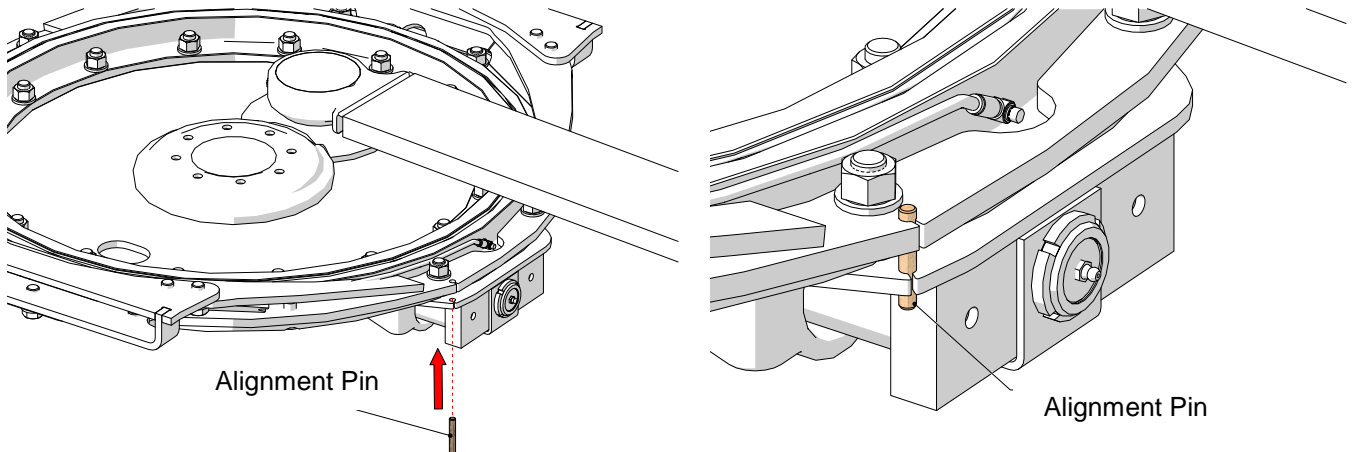


8 ALIGNING

If the trailer, regardless of the reason, needs to be re-aligned, first try to re-align the axle in the axle brackets. Consult the manual of the axle supplier. If re-aligning of the axle by consulting the manual of the axle supplier, regardless of the reason, is still out of range. Then the length of the steering bar can be changed to re-align the trailer. A trailer with steering requires some attention when aligning. Please consult the description below to change the length of the steering bar.

8.1 Changing length of the steering bar:

Locking the front unit

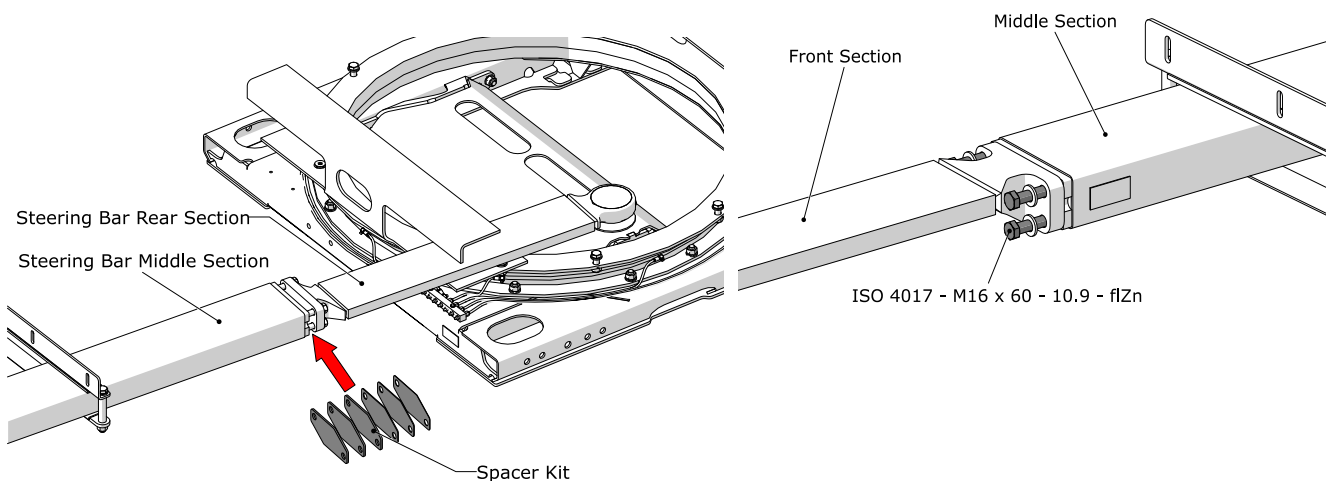


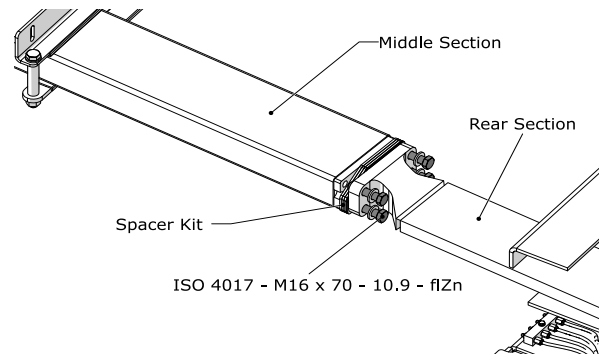
Align the holes in rotor and stator and lock them with an 8mm pin. Align the steered axle, preferably with a laser measuring device. Measure the free space between the middle and front parts of the steering bar as shown below.

Use the spacer kit to fill up any space between these two sections, and fix front and middle section. Check if the axle alignment is still correct, and if necessary, use an accurate axle alignment system to correct. Consult the manual of the axle supplier. Use torque wrench to ensure the steering bar bolts are tightened correctly.

Spacing kit plates in several dimensions

Tightening torque 300 Nm

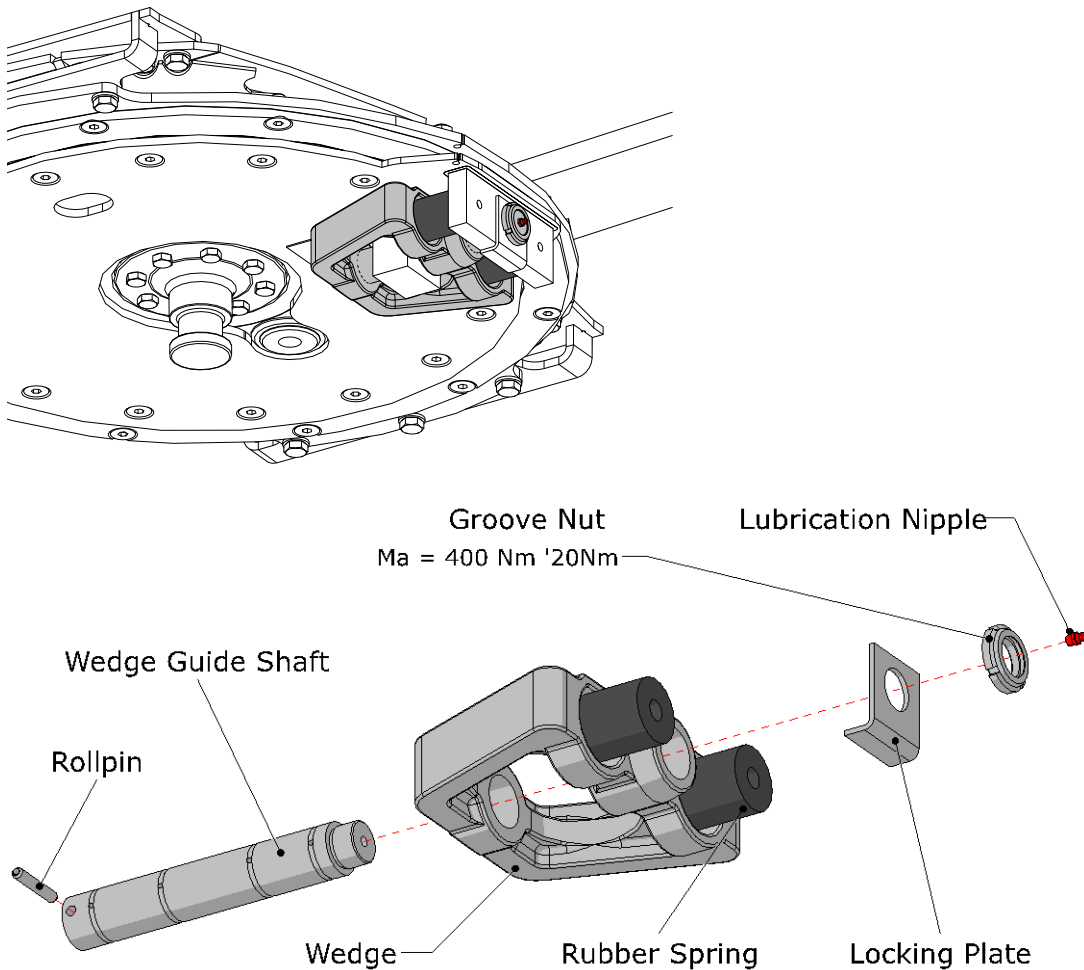




9 STEERING WEDGE

The steering wedge is a moving part, so it also requires lubrication.

Parts of the steering wedge and position of lubrication nipple



9.1 Instruction

- Visually check the steering wedge to see whether there is any damage that could lead to the improper functioning of the system.
- Clean the lubrication nipple at the back of the steering wedge and lubricate the steering wedge along this until the edges of the wedge and the central axle have a fresh grease cover.

- Check whether the rubber spring blocks haven't dried out and don't show any cracks.
- Check the steering wedge for functionality by feeling whether it can still move freely on the axle.
- Damaged parts must always be replaced by new parts

9.2 Inspection periods

The lubrication of the steering wedge and its inspection need to be carried out annually.



The lubrication point on the steering wedge cannot be connected to an automatic lubrication system and must therefore always be lubricated manually.

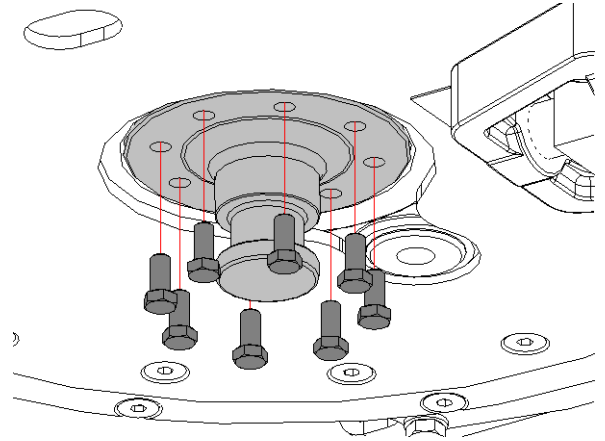
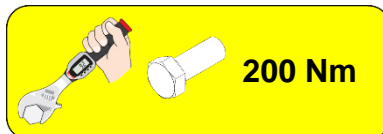
10 KINGPIN

The kingpin used is a standard product, without modifications.

10.1 Instruction

- Visually check the kingpin to see whether there is any damage that could lead to the improper functioning of the system.
- Check the fixing bolts of the kingpin at the tightening torque (200 ± 10 Nm).
- Damaged parts must always be replaced by new parts.
- Never reuse the kingpin bolts. Always use the original SAF Holland bolts.
- Check the diameter of the kingpin in the driving and transverse direction.
- For further maintenance always follow the instructions of the SAF 50S15 Manual.

Scan the QR code below for the SAF 50S15 Manual.



10.2 Inspection periods

- Visually check the kingpin and the fifth wheel coupling for deformities and/or damage. Check whether the kingpin and the fifth wheel coupling have enough grease.
- Every 50,000 km or six months (what is reached first).
- Check the kingpin and absorption for wear, damage and cracks.
- Check the kingpin with limit gauge as written in the SAF 50S15 Manual.



Always ensure that there is enough grease on the fifth wheel coupling of the trailer before initial use.

11 CLEANING



Always ensure that there is enough grease on the fifth wheel coupling of the trailer before initial use.

If this has to be done, after cleaning with high pressure, re-lubricate the turntables as described in chapter 3.1.

12 OVERVIEW

Chapter in this manual	Instruction	First time between four weeks and three months after use	After 50,000 km or after six months (*)	After 300,000 km or after one year (*)	Every three months	Annually
3.1	Manual lubrication of the turntables	X			X	
3.2	Automatic lubrication of the Turntables (**)				N/a(***)	
4	Checking the turntables above the axle(s) for bearing play			X		X
5	Checking the turntables in the kingpin module for bearing play			X		X
6	Checking bolts and nuts	X		X		
7.1	Visual inspection of and steering bar supports			X		X
9	Lubrication and checking the steering wedge					X
10	Checking the kingpin	X	X		X	

(*): whatever is reached first.

(**): central lubrication must be assembled as of initial use.

(***): the central lubrication ensures a continuous lubrication and therefore doesn't have a fixed interval such as for manual lubrication.

13 CONTACT INFORMATION

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