



PEECON

Biga | Cargo | Euroline



USER'S MANUAL

Extension: steering systems, axles and suspensions

2026

Biga | Cargo | Euroline
With forced hydraulic or Mobil Elektronik steering system

The main function of this document is to ensure a safe and efficient interaction between man and machine. Save this document for future reference.

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The contents of this user manual may also be modified without prior notice. warning. For information regarding setting up, maintenance work or repairs in which this user manual not provided, please contact the technical service of your supplier.

This user manual has been compiled with all possible care, but Peeters Group B.V. cannot assume responsibility for any errors in this user manual or for the consequences of which.

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2. Introduction

2.1 Preface

Congratulations on purchasing your new Peecon machine. With this machine you are assured of quality and solidity.

This document explains the operation and maintenance of the hydraulically forced and Mobil Elektronik steering system of your Peecon machine.

If your Peecon machine is equipped with such a steering system, it is strongly recommended that you read this manual carefully before starting the machine. It is very important that you understand all the information in this document. This contributes to safe operation, optimal performance and a longer service life of the machine. Always keep the manual with the machine so that it can be easily consulted.

You can request the most recent version of this manual from your dealer. A digital version is also available at <https://peecon.com/downloads>.

Do you have questions or problems that this manual does not answer? Please contact your dealer or Peeters Landbouwmachines B.V.

Warranty does not cover damage resulting from incorrect operation or improper use. Are you unsure about a service, maintenance or repair operation? Always consult an expert.

The manufacturer reserves the right to make changes to the machine without prior notice. The images, dimensions and weights in this manual can also change in the meantime and are therefore not binding.

Competent persons are persons who:

- Have built up a certain level of knowledge through education / training (internal course specific to the Biga feed mixer) and who have certain skills to operate the machine.

Technically competent persons are persons who:

- Be competent and have built up a certain technical level of knowledge (minimum MBO level diploma) through education/training, and who are familiar with the technology of the machine and are aware of the possible dangers and risks.
- Be competent to set up, operate, clean and maintain the machine (for example, a service technician of Peeters Landbouwmachines B.V.).
- clean and maintain the machine (for example, a service technician of Peeters Landbouwmachines B.V.).

2.2 Warranty and liability

In order to avoid misunderstandings, please read this manual in full. We have paid a lot of attention to the safety and functionality of your machine. Below you will find the most important information about warranty and liability.

Every machine is carefully checked at the factory to rule out material and manufacturing defects. Peeters Landbouwmachines B.V. will replace defective parts under warranty free of charge for a period of 12 months or the first 750 operating hours after delivery (whichever is reached first), with the exception of components subject to wear under normal use.

The following cases will void the warranty:

- If you deviate from the operating and maintenance instructions in this manual, without written permission from the manufacturer.
- When maintenance is not carried out according to the prescribed maintenance schedule. All maintenance work must be documented.
- When non-original parts are used in maintenance or repairs. Original parts are listed in the parts list, downloadable via <https://peecon.com/downloads>.
- If the user statement below is not fully completed, signed, scanned and submitted by the customer.
- If changes are made to the machine without explicit permission of Peeters Landbouwmachines B.V.
- When the machine is resold.

The warranty is limited to the supply of replacement parts and **does not** cover:

- Loss of revenue due to machine downtime.
- Transport costs to and from a workshop.
- Costs for special tools.
- Costs for mechanics.

For warranty claims, please contact your dealer. The costs of parts might initially be charged and will be reimbursed after inspection by an authorised dealer or by Peeters Landbouwmachines B.V.

User statement

Write down the following information about your machine to help you report problems and order parts.

1. Model: Biga _____ 2. Delivery date: _____

3. Machine serial number: _____

By signing, the user confirms that the manual has been fully read and understood:

Name: _____

Signature: _____



2.3 Safety instructions

Improper or careless operation can lead to accidents. Therefore, read all instructions carefully and follow the safety instructions. Also refer to the manuals of other parts, such as the tractor or PTO. Anyone using the machine should know these instructions.



WARNING! *The terms “left,” “right,” “front,” and “rear” are always defined from the driving direction of the tractor.*

In this manual, different symbols are used:

| Symbol | Meaning |
|---|--|
|  | WARNING FOR DANGER OR DESCRIPTION Warnings and additional information. |
|  | TIPS AND OPINIONS Suggestions and advice to make your work easier. |

3. Important safety measures



WARNING! Please read this manual carefully before using the machine. Consult the manual if you have any questions or problems. Check that the factory settings are unchanged and that no parts have been detached during transport. Make sure that all warning signs are present and in the right place. In addition, always check the drawbar eye for any defects before using the machine.

3.1 General

The driver or operator is always responsible for damage and/or accidents caused by improper use or non-compliance with safety regulations.

Before each use, check the following points:

- Carefully inspect the machine for visible damage and loose parts.
- Check and verify that all connectors are properly adjusted and properly secured.
- Check and verify that the hub caps are present and installed correctly on the axles.
- Check and verify that the prescribed maintenance has been carried out.
- Check and verify that the wheel nuts are torqued to specification and that the tyres are inflated to the right pressures.
- Study the safety instructions.



WARNING! We draw your attention to a number of situations where extra caution is required, to ensure your own safety and that of others in the area.

The following situations require extra caution:

- Starting the tractor to test or bleed the steering system cannot take place in a closed space due to hazardous exhaust gases.
- Always look around the machine and tractor before driving away or turning on the machine.
- Pay extra attention to people, animals and especially children in the vicinity of the machine.
- Ensure good visibility while working.
- It is forbidden to enter or reside on the platform or on the machine itself during transport or use.
- Never enter the space between the tractor and the machine unless the vehicle is protected against rolling away (e.g. with wheel chucks or the hand brake).
- Stay out of the turning circle and hazard area of the machine.
- Never enter the steering radius of the wheels when the system is switched on. This can lead to serious injuries and dangerous situations, including entrapment.
- Always check that the tractor is properly attached and locked to the machine's drawbar eye and steering rod.

In addition to the instructions in this manual, please observe the generally applicable safety and accident prevention regulations. Get familiar with all systems, controls and their functions before using the machine.

- Conduct a safety inspection on the machine and the tractor before each use, both for work and for road transport.
- Always wear tight-fitting clothing and avoid loose-fitting garments, as these can get caught on the rotating components of the machine.
- Bear in mind that towed machines and front weights have a negative effect on the handling, controllability and braking performance of the tractor. Always ensure sufficient steering and braking capacity.
- When making turns, take into account the larger width (turning radius) and mass of the machine.
- The machine may only be operated by one person at a time.
- Secure the machine before you leave the tractor: Turn off the engine, remove the ignition key and, when operating electrically, turn off all functions and disconnect the power supply.
- Connect the machine as prescribed and always check and verify that all connections are attached and secured properly.
- Exercise particular caution during coupling and uncoupling due to pinch and crush hazards.
- Repair any damage to paint or wear immediately before using the machine again. If the machine is still covered by the warranty period, please contact your dealer or the manufacturer first.
- Regularly check that hydraulic hoses are undamaged. Immediately replace damaged hoses with hoses of the prescribed quality (SAE 100 R2A according to DIN 20022-2).
- Never attempt to seal a leak in an operating hydraulic system by hand. Oil can penetrate the skin and cause blood poisoning.
- Always check the length of the steering rod during coupling. An incorrectly adjusted steering rod can damage the steering system.



WARNING! Pay extra attention to these points when you couple the machine behind the tractor for the first time. This prevents the machine from malfunctioning or not working properly.

3.2 Hazard zone

No person shall be in the danger zone during use.

- Sides: maintain a minimum distance of 5 meters
- Front and rear: maintain a minimum distance of 10 meters

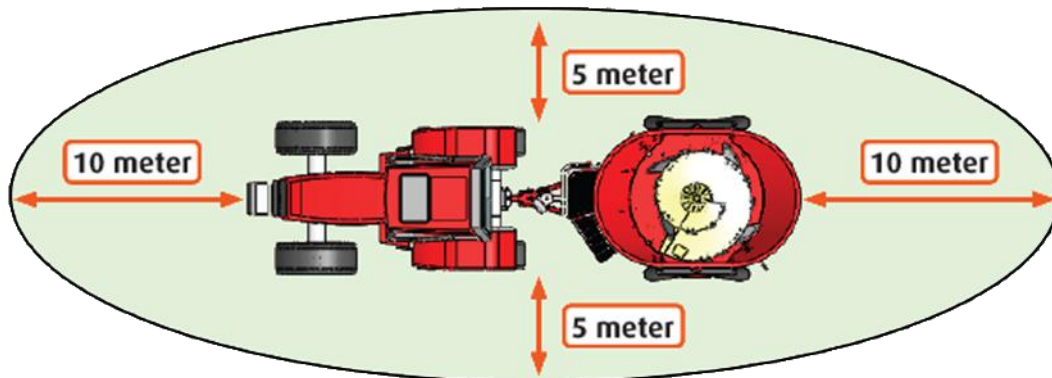


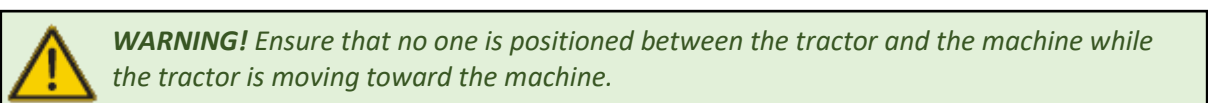
Figure 3-1 - Hazard zone



The machine produces less than **70 dB(A)**. Hearing protection is not mandatory, but may be recommended depending on ambient noise. Make sure hearing protection is always available.

Important safety instructions:

- Connect the machine according to the prescribed instructions.
- Only use tractors that are suitable for operating and transporting the machine.
- Never exceed:
 - The maximum permitted axle load.
 - The maximum permitted vertical load on the tractor drawbar eye.
 - The maximum permitted total weight of the tractor.
- Always secure the machine against rolling away before uncoupling.
- Place the support leg in the correct position (safety position) when connecting and disconnecting.
- Pay extra attention to pinch and crush hazards between the tractor and the machine, especially during coupling.
- Check and verify that the steering rod is adjusted to the correct length.
- Check whether the connected hydraulic hoses:
 - Do not rub against sharp or moving parts.
 - Have sufficient freedom of movement during turns.



3.3 Use of machine

- Wear tight-fitting clothing and avoid loose-fitting garments, as these can get caught on the rotating components of the machine.
- Familiarize yourself with all the parts and controls before working with the machine.
- Never exceed the maximum permitted total weight, the maximum axle load or the maximum vertical load on the drawbar eye.
- A towed vehicle with steered axles will react differently during turns and have a different turning circle than a non-steered towed vehicle.
- Do not let people in the vicinity of the machine during use.
- Always secure the tractor against unwanted starting or rolling before leaving the driver's seat.

3.4 Safety symbols

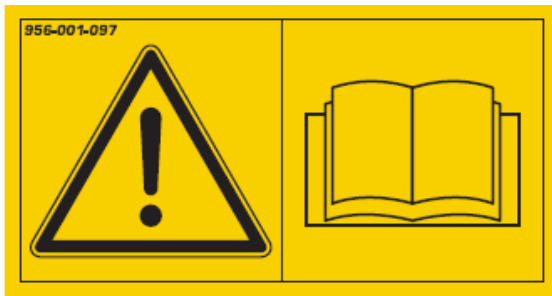
Stickers with safety and warning signs are affixed to your machine. These indicate where risks are present, despite the inherent safe design of the machine.

Always read the manual before using the machine. Regularly check that the stickers are present and readable. Are they damaged or illegible? Do not continue working with the machine and have the stickers replaced by your dealer.



WARNING! In order for every (new) user to work safely, the stickers must always be clean and clearly legible. In the event of damage, these should always be replaced. Stickers are available through your dealer.

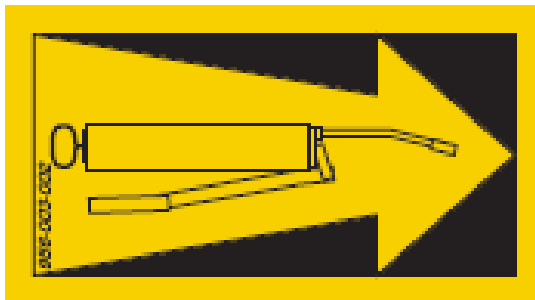
3.4.1 Declaration of safety symbols



Read and comply with the manual and safety regulations before using the machine.



The hydraulic lines can cause physical injury and environmental damage. Only work on the hydraulic system when it is completely pressure-free.



Here is one or more lubrication points. Lubricate according to the maintenance schedule.



Check the lubrication points every 10 operating hours to avoid wear and high costs. Use the prescribed lubricants. If in doubt, please contact your dealer or Peeters Landbouwmachines B.V.



This is a lifting point. Only use these points to lift the machine.



No lifting point. Do not attach cables, chains and / or other lifting equipment here. This can cause damage to the machine.

4. Steering system coupling

4.1 Drawbar eye

Your towed vehicle may be equipped with different towing eyes. This also applies to the steering rod drawbar eye. For example, the steering system can be equipped with a ball or pin connection. The connection type of the steering system does not affect its operation and only serves to provide compatibility with the tractor. The most common combination is a Scharmüller K80 and K50 draw eye combination. This combination is in accordance with ISO 26402 and is therefore preferred. For the distances between the drawbar eyes, see Figure 4-1. Peeters Landbouwmachines B.V. recommends that all drawbar eyes, especially the steering rod drawbar eye, be fitted with a locking mechanism, so the coupling cannot come undone unexpectedly.

It is recommended to fit the steering system with two steering rods, one on the left and one on the right of the main drawbar eye. The steering system can be equipped with just one steering rod, either on the left or the right of the main drawbar eye. This simplifies the coupling process, but necessitates the locking mechanism on the steering shaft drawbar eye.

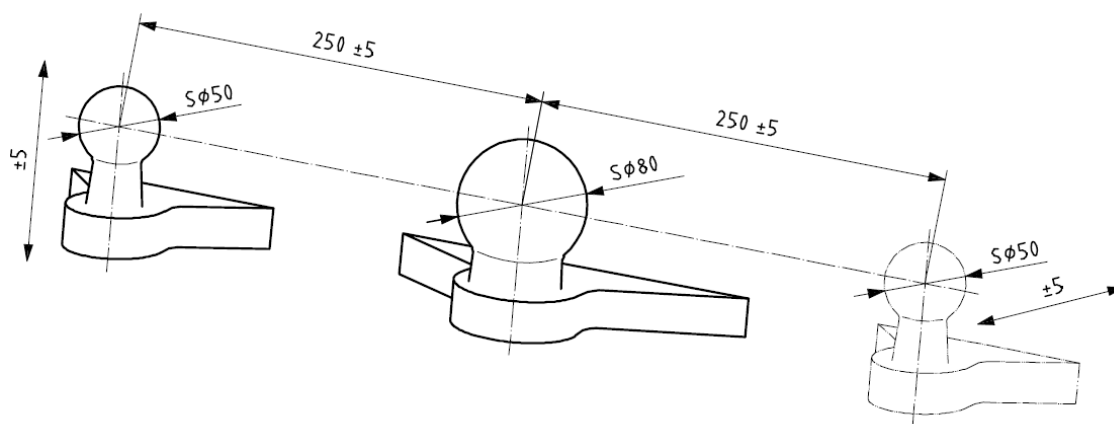


Figure 4-1 The distances between the trailer drawbar and steering drawbar eyes in millimetres

The design of the steering system is based on the eye-to-eye distances, approximately 250 millimetres, specified in this ISO standard. Therefore, it is important that the coupling on your tractor corresponds to this distance. A shorter distance is not dangerous for the machine; however, it will result in a reduced steering angle and poorer manoeuvrability of the towed machine. A greater distance, on the other hand, is hazardous for the steering system, as it can overload the steering mechanism in sharp turns and cause damage to costly components.

5. General maintenance



5.1 Safety measures and required PPE

Timely and properly performed maintenance is essential for proper operation and a long service life of the machine. Always use the prescribed personal protective equipment (PPE) while working on the machine. Before performing any maintenance, cleaning or repair work, ensure that at the following safety measures and PPE are met:

- The ignition of the tractor is switched off and the key is removed.
- The machine is parked on a stable, flat surface and is secured against rolling away.
- The handbrake is engaged and, if fitted, the power take-off is disconnected.
- The pressure in the hydraulic system has been released. In hydraulic systems, such as the spring and steering system, residual pressure may be present, due to normal use of the machine. These systems must be depressurised before they can be worked on.
- A safe working environment has been created.
- You wear suitable personal protective equipment: work gloves, safety glasses and safety shoes.
- The steering system must be switched off and completely disconnected before any work is performed, unless explicitly stated in the maintenance instructions.

Work may only be carried out by qualified personnel who have read and understood all operating and safety instructions.

5.2 Hydraulic hoses



WARNING! Never look for a hydraulic leak by hand. High-pressure oil can penetrate the skin and cause blood poisoning. If you suspect this has happened, consult a medical expert immediately.



WARNING! Before working on the hydraulic system, always check that the hydraulic system is completely pressure-free. Dismantling a component that is still under pressure can cause serious injury.

Hydraulic hoses and lines must be checked by an expert for damage and wear at least **once a year** and replaced at least **once every seven years**. This applies to all hydraulic hoses in the machine, including the hoses that are part of the steering system. If damage or wear is detected, the relevant part must be replaced or repaired immediately before the machinery is put back into service.

New replacement hoses must meet the minimum required quality: **SAE 100 R2A according to DIN 20022/2**. Always avoid contact with leaking liquids under pressure. If work is carried out on the hydraulic system, the system must be completely depressurised.



5.3 Wheel nuts, chassis bolts and drawbar eyes

After the first 8 hours of operation, all bolt connections must be checked and tightened to the correct torque specification.



WARNING! *These torque specifications do not apply to the axles and suspension components. These are specifically explained in chapters 7 and 9.*

| Dimension | Key width (mm) | Tightening torque (Nm) |
|-----------------------|----------------|------------------------|
| M8 | 13 | 27 |
| M10 | 17 | 57 |
| M12 | 19 | 101 |
| M14 | 22 | 148 |
| M16 | 24 | 230 |
| M18 | 27 | 348 |
| M20 | 30 | 464 |
| M22 | 32 | 634 |
| M24 | 36 | 798 |
| M27 | 41 | 1176 |
| M30 | 46 | 1597 |
| M16x2 (drawing eye) | 24 | 600 |
| M20x2.5 (drawing eye) | 30 | 600 |

6. Automatic lubrication system

Your machine can optionally be equipped with an automatic lubrication system. The automatic lubrication system is mounted on the left or right front of the chassis (see Figure 13-2) and will automatically grease the entire machine. As a result, it is no longer necessary to perform these tasks manually. If your machine is equipped with an automatic lubrication system, all lubrication intervals from this manual can be skipped. You can find more information about setting up the lubrication system in the supplied manual of the automatic lubrication system. If this does not answer all your questions, you can always contact your dealer or Peeters Landbouwmachines B.V.



Figure 6-1 Variant of an automatic lubrication system used by Peecon

Peecon uses a number of different variants of the automatic lubrication system. The big difference between these variants is the grease reservoir capacity. Larger and more complex machines have more lubrication points, so the lubrication system will consume more grease. To achieve a similar maintenance and refill interval, these larger machines are therefore equipped with a lubrication system with a larger reservoir. This lubrication system is properly adjusted to your machine at the factory. As a result, it is only necessary to check the grease level before every use and verify the level is between the minimum and maximum indicated on the reservoir. When the grease level gets close to the minimum, it is time to refill the grease. This can be done by means of the integrated grease nipple on the left side of the pump next to the yellow plug or lubrication line, see number 1 in Figure 6-2. Connect the grease gun to the grease nipple and pump until the reservoir is refilled to the maximum level.



Figure 6-2 Lubrication system refill grease nipple

7. Axle maintenance

Depending on the specifications of your machine, it may be equipped with axles from a number of different manufacturers. This means that not all machines have to be maintained in the same way, with regard to the axles.

The manufacturer of the axles can be determined by inspecting the hub cap of the axle. All axle manufacturers used by Peeters Landbouwmachines B.V. use the hub cap to display their logo and/or their company name. The hub cap is the part on the axle that protects the wheel bearings from dust and dirt. These can be found in the middle of both ends of the axles, as seen in Figure 7-1. All the different hub caps of the axles used by Peeters Landbouwmachines B.V. can be found in Figure 7-2.



Figure 7-1 Position of the hub cap



The hub cap for a BPW axle



The hub cap for an ADR axle



The hub cap for a Colaert axle

Figure 7-2 The different hub caps on the axles

7.1 BPW axles

If your machine is equipped with BPW axles, they must be maintained according to the maintenance schedule below. The specific work to be carried out is explained in detail in the supplied manual of the BPW axles. In case of doubt or questions about the maintenance of the axles, please contact your dealer or Peeters Landbouwmachines B.V. The maintenance manuals for BPW axles can also be found on the BPW website (<https://www.bpw.de/en/service/downloads>).

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN TRIP | AFTER 40 HOURS OF USE | AFTER EVERY 200 HOURS OF USE | AFTER EVERY 500 HOURS OF USE OR ANNUALLY | AFTER EVERY 1000 HOURS OF USE OR AT LEAST ANNUALLY |
|--|----------------------------|-----------------------|------------------------------|--|--|
| LUBRICATE WITH ECO-LI 91 GREASE | | | | | |
| 1: STEERING KNUCKLE , TOP AND BOTTOM | | ○ | | | |
| 2: BLOCKING CYLINDER HEADS ON THE SELF-STEERING AXLES | | | ○ | | |
| 3: BRAKE SHAFT BEARING, OUTSIDE AND INSIDE | | | ○ | | |
| 4: BRAKE ADJUSTER | | | | ○ | |
| 5: AUTOMATIC BRAKE ADJUSTER | | | | ○ | |
| 6: REPLACE WHEEL HUB BEARING GREASE AND CHECK TAPERED ROLLER BEARINGS FOR WEAR MAINTENANCE WORK | | | | | ○ |
| 1: CHECK WHEEL NUTS | □ | | | □ | |
| 2: CHECK BEARING CLEARANCE WHEEL HUBS | | | □ | | |
| 3: CHECK BRAKE LINING | | | □ | | |
| 4: CHECK BRAKE ADJUSTMENT AT THE BRAKE LEVER | | | □ | | |
| 5: CHECK BRAKE ADJUSTMENT AT THE BRAKE ADJUSTER | | | □ | | |
| 7: BRAKE ADJUSTMENT OF THE CAM BRAKE WITH REVERSING MECHANISM | | | □ | | |
| 8: CHECK BRAKE ADJUSTMENT AUTOMATIC BRAKE COUNTER | | | | □ | |
| 9: CHECK FUNCTION AUTOMATIC BRAKE COUNTER | | | | □ | |

7.1.1 Torque specifications BPW axles

| KEY SIZE [MM] | BOLTS | | TORQUE SPECIFICATIONS [NM] | | |
|---------------|-----------|---------|----------------------------|----------|------------|
| | Number of | Size | Blackened | Dakromet | Galvanised |
| 19 | 4/5 | M12x1,5 | 95 ± 5 | - | 95 ± 5 |
| 22 | 5 | M14x1,5 | 125 ± 5 | - | 125 ± 5 |
| 24 | 6 | M18x1,5 | 290 ± 15 | 270 ± 20 | 320 ± 20 |
| 27 | 8 | M20x1,5 | 380 ± 20 | 380 ± 20 | 420 ± 20 |
| 32 | 8/10 | M22x1,5 | 510 ± 25 | 510 ± 25 | 560 ± 25 |
| 32 | 10 | M22x2 | 460 ± 25 | - | 505 ± 25 |

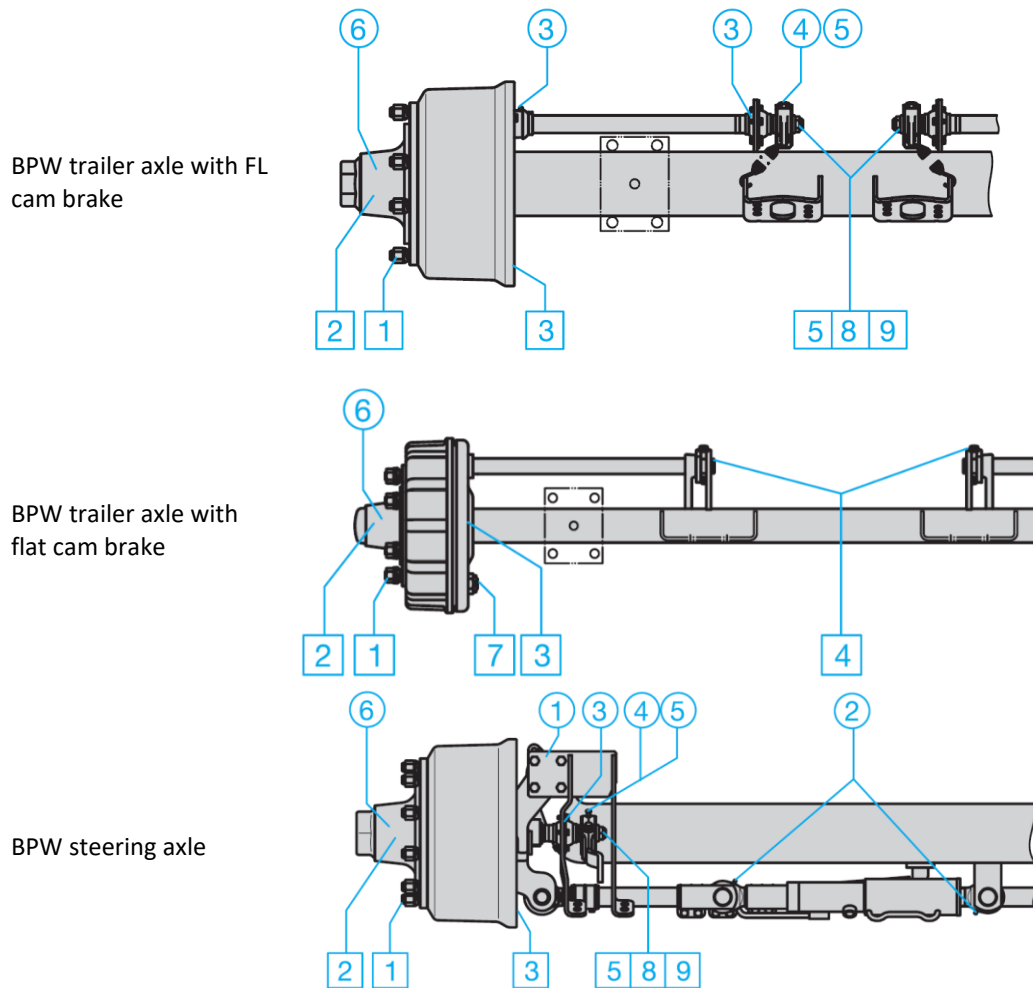


Figure 7-3 Overview of different BPW axles, round icon marks grease points and square marks maintenance

7.2 ADR or Colaert axles

An ADR or Colaert axle must be maintained according to the same maintenance schedule, which is why they are also merged in this manual, as seen in the maintenance schedule below. The maintenance that needs to be carried out is explained in detail in the supplied manual of the ADR/Colaert axles. In case of doubt or questions about the maintenance of the axles, please contact your dealer or Peeters Agricultural Machinery. The maintenance manuals for ADR/Colaert axles can also be found on the ADR website (<https://www.adraxles.com/en/download-area/>).

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN 10 KM | AFTER THE FIRST 200 HOURS OF USE OR 300 KM | EVERY 500 HOURS OF USE OR 8500 KM | EVERY 1500 HOURS OF USE OR 25,000 KM | EVERY 3000 HOURS OF USE OR 50,000 KM |
|---|--------------------------------|---|--------------------------------------|---|---|
| LUBRICATING WITH GREASE: ADR LITOGREASE 3 | | | | | |
| A: WHEEL HUB BEARING GREASE REPLACEMENT AND CHECK TAPERED ROLLER BEARINGS FOR WEAR | | | | | ○ |
| B: BRAKE SHAFT BEARING, OUTSIDE AND INSIDE | | | ○ | | |
| C: BRAKE LEVER OR AUTOMATIC BRAKE LEVER | | | ○ | | |
| D: OUTER TIE ROD END | | | ○ | | |
| E: STEERING KNUCKLE, TOP AND BOTTOM | | | ○ | | |
| GENERAL MAINTENANCE WORK | | | | | |
| 1: CONTROL WHEEL NUTS | □ | | □ | | |
| 2: CHECK BRAKE LINING | | | □ | | |
| 3: CHECK AND ADJUST SPINDLE BEARING PLAY | | □ | | □ | |
| 4: CHECK AND ADJUST BRAKE LEVER | | | □ | | |
| 5: CHECK AND ADJUST STEERING KNUCKLE PLAY | □ | | | □ | |
| 6: CHECK BOLTS STEERING DAMPER | | | | □ | |
| 7: CHECK BOLTS STEERING CYLINDER | | | | □ | |
| 8: CHECK BOLTS CONTROL ANGLE END STOPS | | | | □ | |
| 9: CHECK BOLTS BRAKE CYLINDER | | | | □ | |

7.2.1 Torque specifications ADR/Colaert axles

| KEY SIZE [MM] | BOLTS | | TORQUE SPECIFICATION [NM] | |
|---------------|-----------|---------|---------------------------|------------|
| | Number of | Size | Dakromet | Galvanised |
| 17 | 4 | M12x1,5 | 95 ± 5 | 95 ± 5 |
| 19 | 5 | M14x1,5 | 140 ± 10 | 140 ± 10 |
| 24 | 6 | M18x1,5 | 280 ± 10 | 230 ± 20 |
| 27 | 8 | M20x1,5 | 365 ± 15 | 420 ± 20 |
| 30 | 10 | M22x1,5 | 480 ± 30 | 530 ± 30 |
| 36 | 10 | M24x1,5 | 580 ± 30 | 630 ± 30 |

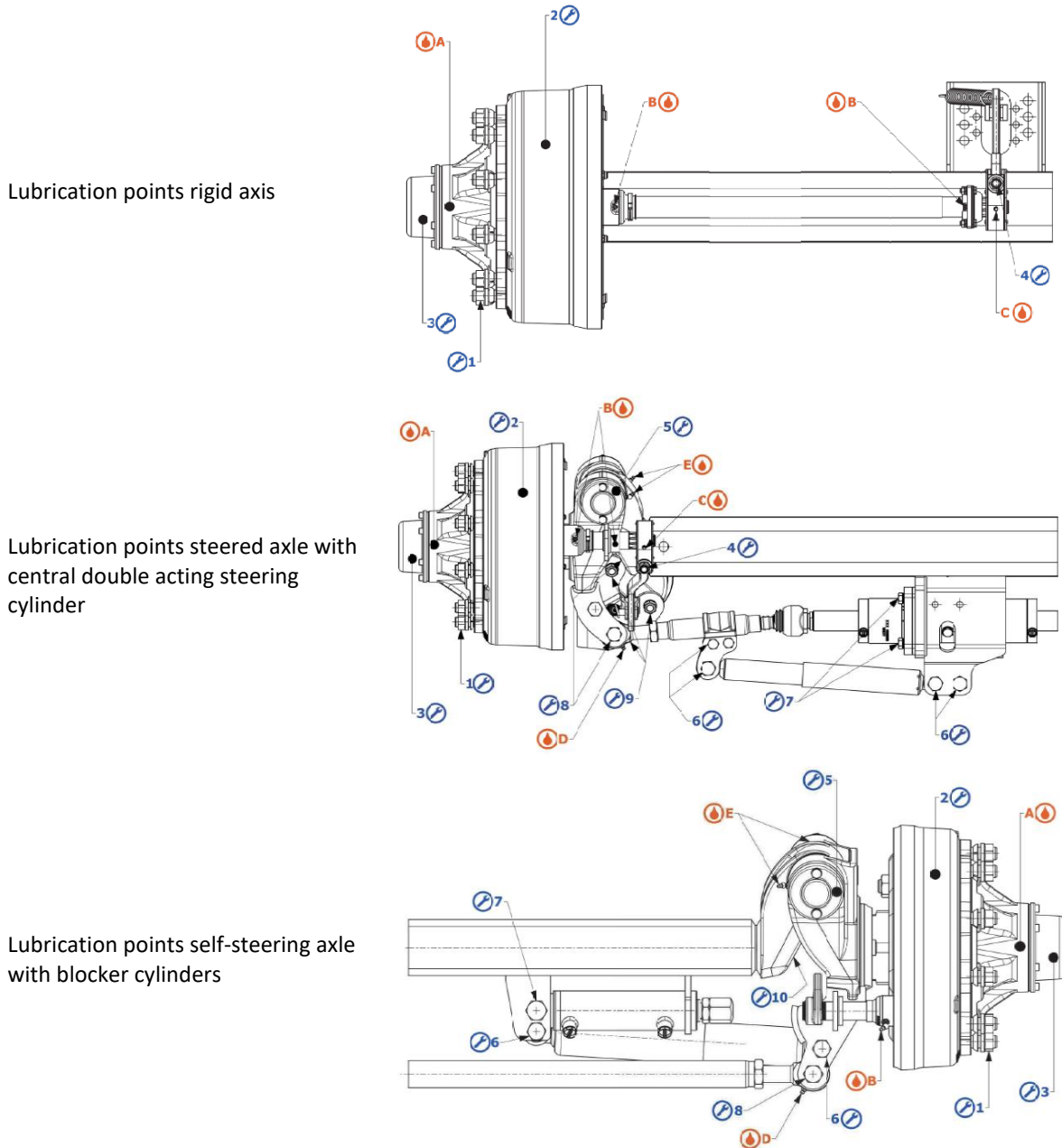


Figure 7-4 Overview of different ADR/Colaert axles, with maintenance and lubrication points

9. Suspension maintenance

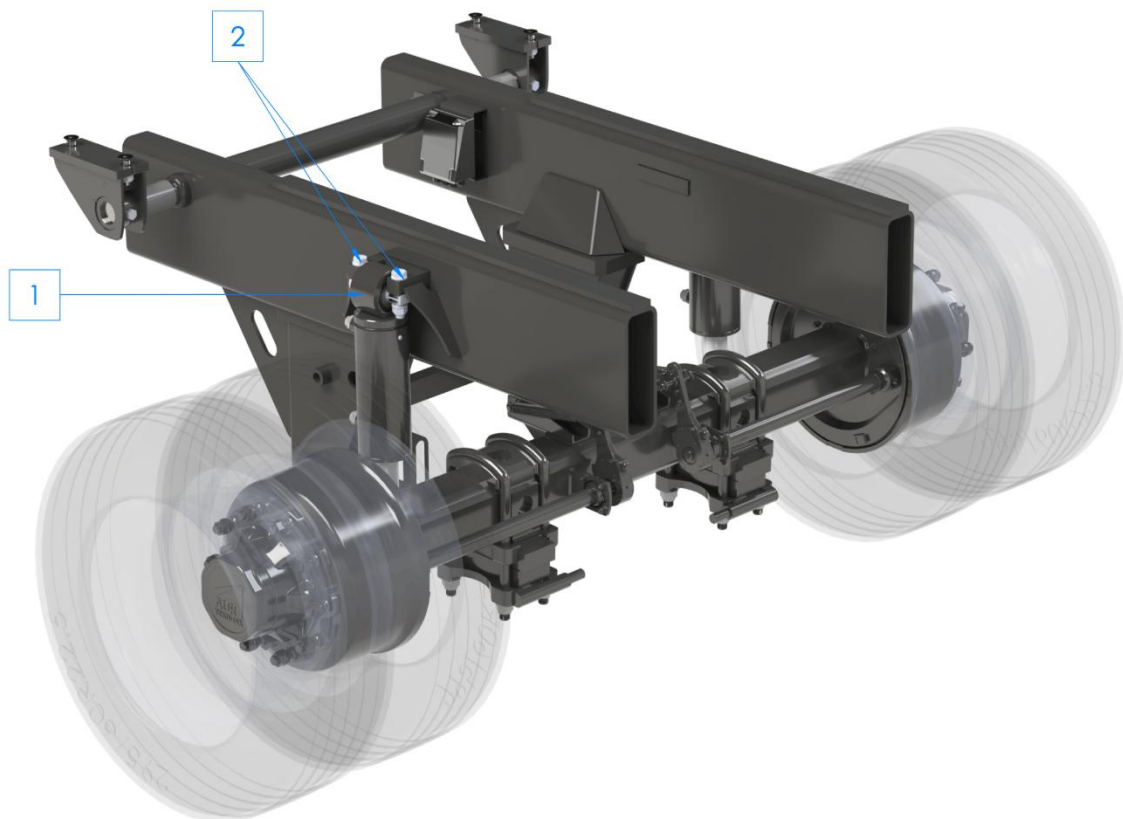
Your machine can be equipped with a suspension system from two different suppliers: Peecon or ADR/Colaert. This results in different maintenance intervals for the suspension systems on the machine. Correctly identifying the manufacturer of the suspension on your machine is therefore extra important. You can identify the manufacturer by inspecting the suspension under your machine for markings, as shown in Chapter 7, Figure 7-2. If in doubt about the suspension manufacturer of your machine, you can always contact your dealer or Peeters Landbouwmachines B.V.



WARNIGN! *The suspension on your machine does not have to be from the same manufacturer as the axles. Axles are carefully selected according to the required steering angle and the suspension is selected according to the required vehicle mass and application. So always carefully check the manufacturer of the axles and suspension before maintenance tasks are carried out.*

9.1 Peecon hydraulic suspension

The Peecon hydraulic suspension has been specially developed by Peeters Landbouwmachines B.V. to deliver high performance and reliability. In order to achieve the maximum performance from the suspension and to achieve a long service life, it is important that periodic maintenance is carried out on the suspension. The maintenance schedule can be found in the table below. In



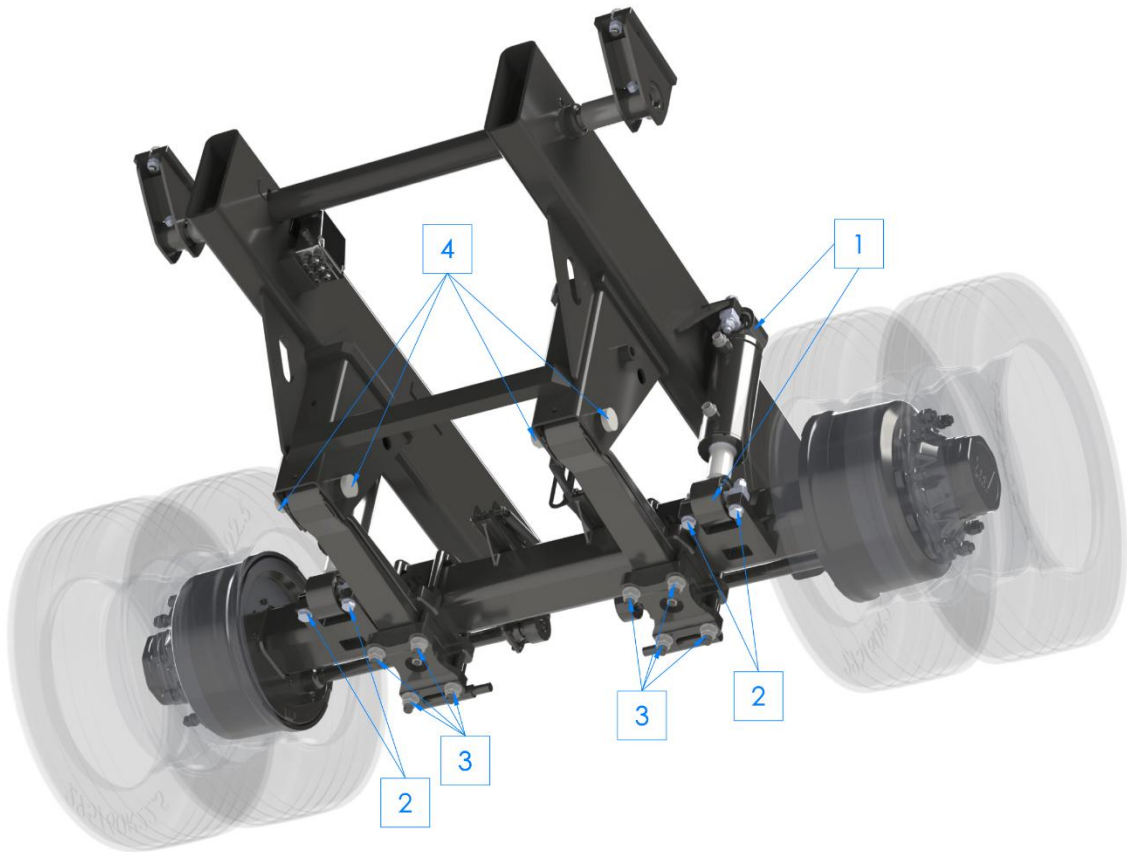
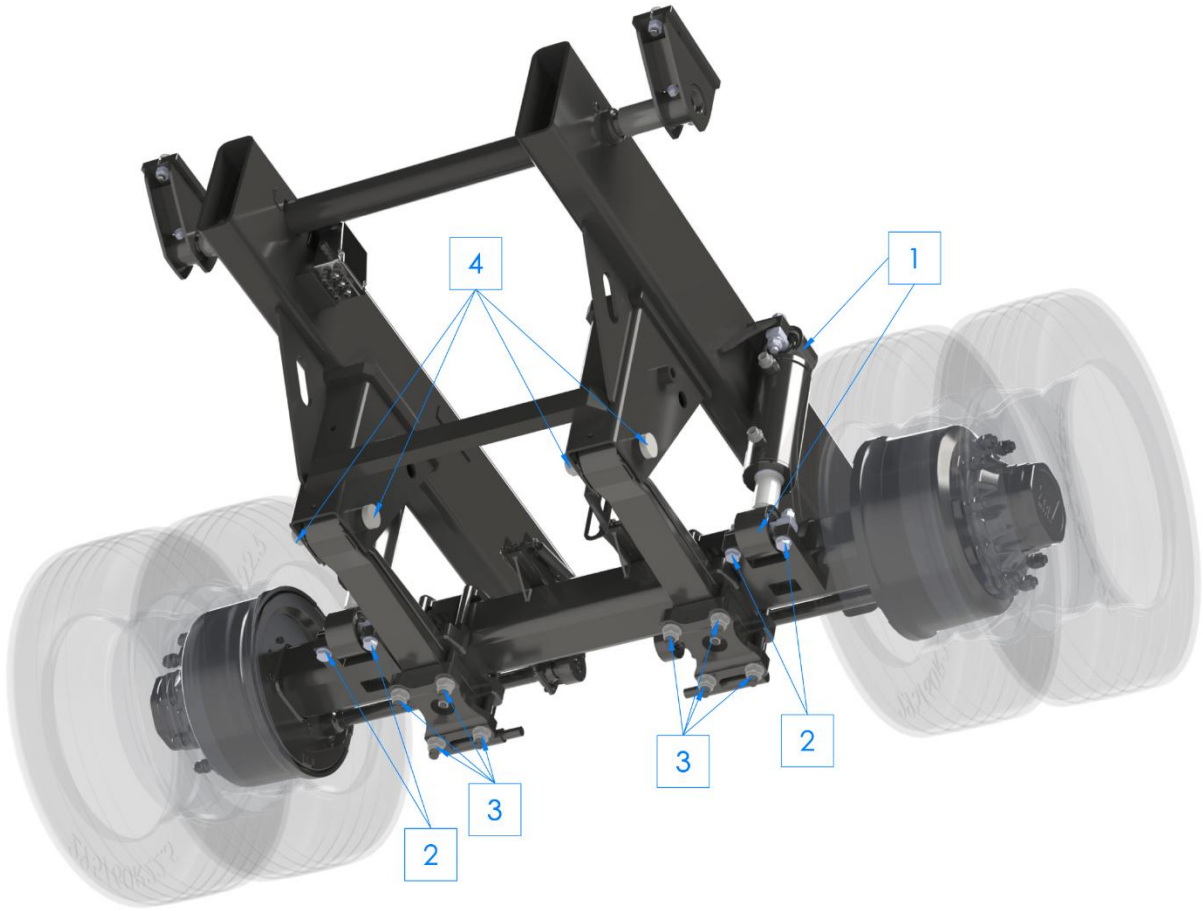


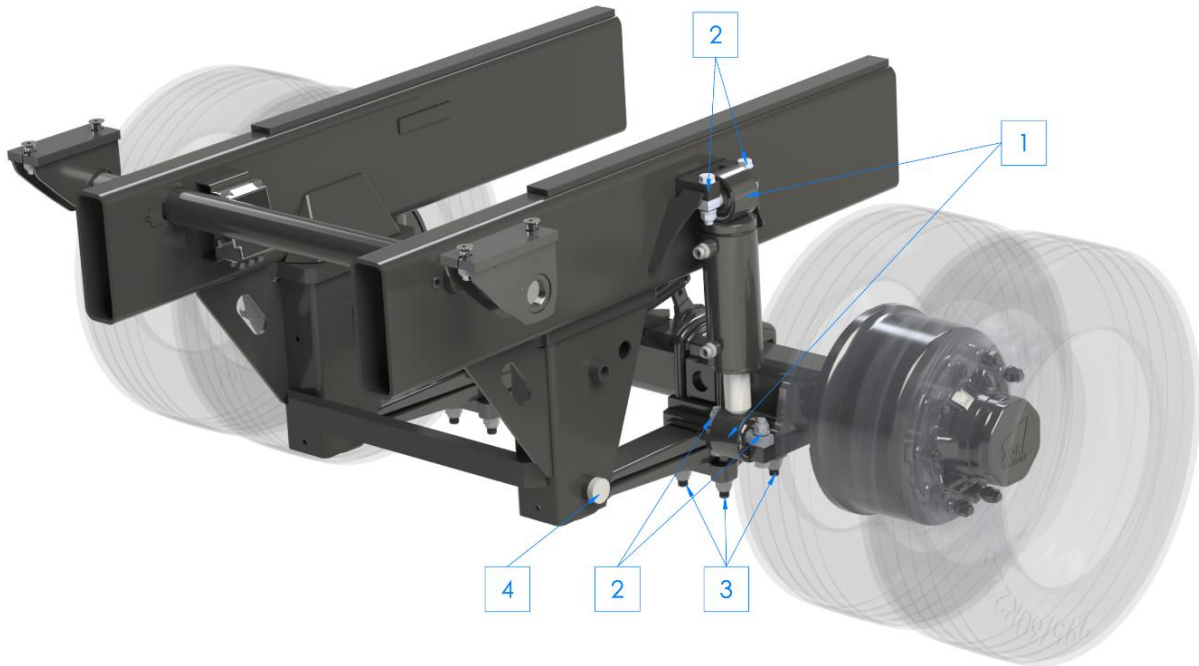
Figure 9-1, the lubrication points are indicated with the circles and the maintenance points with the squares. Please contact the dealer or Peeters Landbouwmachines B.V. if you have any doubts or questions about the maintenance of the Peecon hydraulic suspension.



9.1.1 Peecon hydro-pneumatic suspension^[TvL1]

The maintenance schedule for the Peecon hydro-pneumatic assemblies can be found in the table below.

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN RIDE | EVERY 200 HOURS OF USE | EVERY 500 HOURS OF USE OR ANNUALLY |
|---|----------------------------|------------------------|------------------------------------|
| <ul style="list-style-type: none"> ○ LUBRICATE □ MAINTENANCE WORK | | | |
| MAINTENANCE WORK | | | |
| - VISUAL INSPECTION OF ALL COMPONENTS FOR DAMAGE AND WEAR | | □ | |
| 1: HYDRAULIC CYLINDER: VISUALY CHECK RUBBER BUSHINGS ON THE TOP AND BOTTOM | | □ | |
| 2: HYDRAULIC CYLINDER: CHECK BOLTS; | | | □ |
| M20 – 460 NM (415 – 505 NM) | | | |
| 3: TIGHTEN AXLE U-BOLTS; | □ | □ | |
| M24 – 650 NM (605 – 715 NM) | | | |
| 4: TIGHTEN SPRING BOLTS; | □ | | □ |
| M30 – 900 NM (840 – 990 NM) | | | |



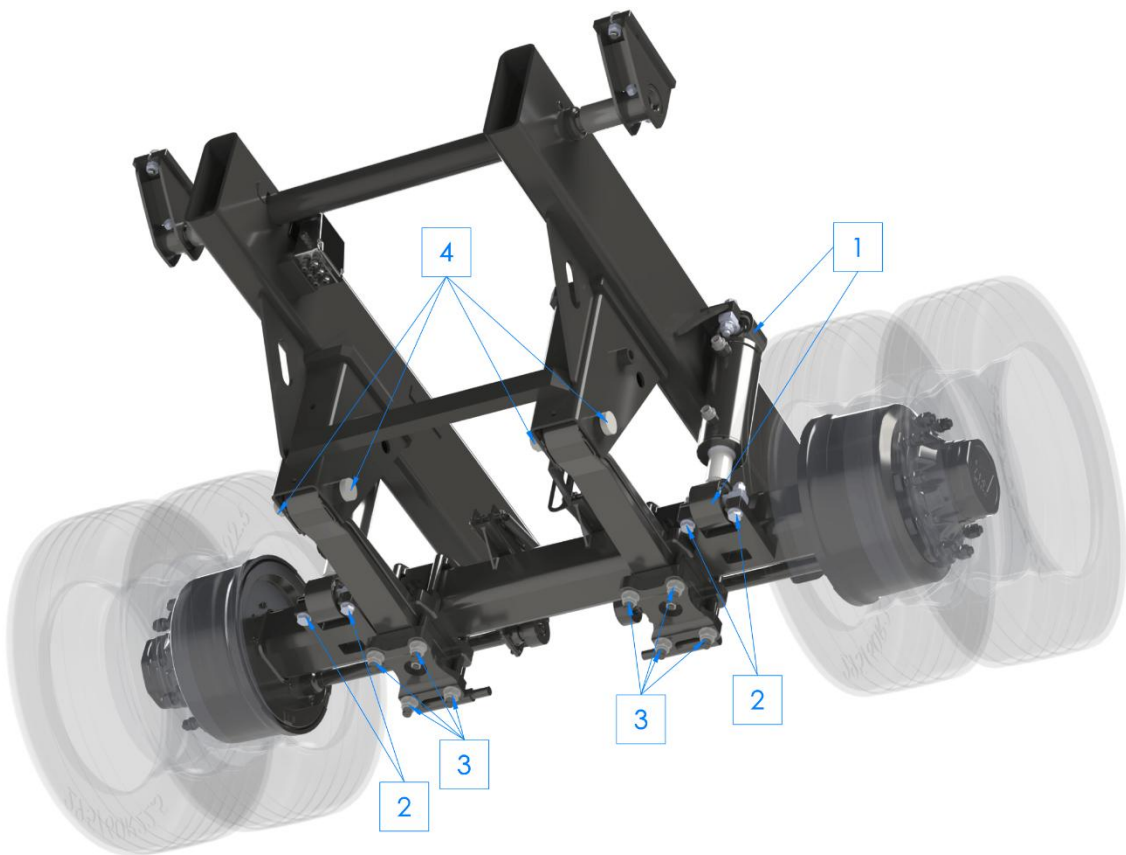
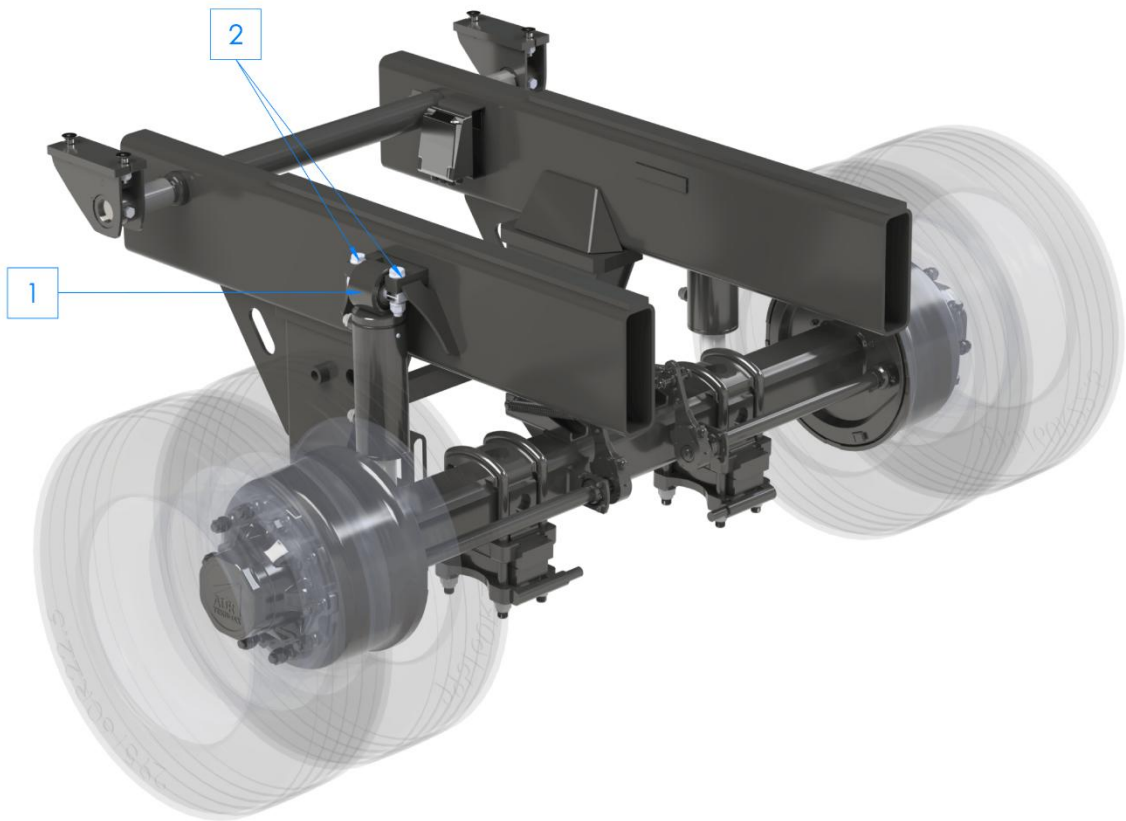


Figure 9-1 Peecon hydro-pneumatic suspension

9.1.2 1: Hydraulic cylinder: Visual check rubber bushings top and bottom

The hydraulic cylinder is equipped with a rubber bushing at both ends. This has a number of advantages, such as ease of maintenance and an improvement in suspension performance. However, the rubber of this bushing will dry out and crack as the machine ages. Therefore, check the rubber bushing every 200 operating hours for signs of cracks and replace the bushings when these are detected.

9.1.3 2: Hydraulic cylinder: check bolts

The hydraulic cylinder is attached top and bottom with two bolts at each end. These bolts are responsible for keeping the hydraulic cylinder in place. Check that these bolts are still tight by retightening them every 500 hours of use or annually. The torque specification for these bolts is 460 Nm.

9.1.4 3: Tighten axle U-bolts

The spring functions as a trailing arm that is connected to the axle by two U-bolts per side, four in total for the complete axle. These U-bolts have a nut at each end, with a total of 8 nuts per axle. These must be tightened to the correct torque specification, namely 650 Nm. Check the tightening torque after the first loaded trip and after every 200 hours of use.

9.1.5 4: Tighten spring bolts

The spring bolts connect the leaf springs to the spring supports. Each side has one spring bolt, so the total axle has two spring bolts. These must be torqued to 900 Nm. Retorque these bolt after the first loaded trip and after every 500 hours of use or at least once a year.

9.2 ADR/Colaert suspension

The maintenance manuals for ADR/Colaert suspension systems are included with your machine, but can also be requested from your dealer, Peeters Agricultural Machinery or downloaded directly from the ADR website (<https://www.adraxles.com/en/download-area/>).

9.2.1 Mechanical bogie suspension

The maintenance schedule for ADR/Colaert bogie suspensions can be found in the table below. The specifics are explained in the supplied manual of ADR/Colaert.

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN 10 KM | AFTER THE FIRST 500 HOURS OF USE OR THE FIRST 8500 KM | EVERY 500 HOURS OF USE OR 8500 KM | EVERY 1500 HOURS OF USE OR 25,000 KM |
|--|-----------------------------|---|-----------------------------------|--------------------------------------|
| <ul style="list-style-type: none"> ○ LUBRICATE/GREASE □ MAINTENANCE WORK | | | | |
| LUBRICATING WITH GREASE: ADR LITOGREASE 3 | | | | |
| A: SUPPORT BEARING LUBRICATION | | | ○ | |
| GENERAL MAINTENANCE WORK | | | | |
| 0: VISUAL INSPECTION OF ALL COMPONENTS | | □ | | □ |
| 1: CHECK AND TIGHTEN U-BOLTS AXLE | □ | □ | | □ |
| 2: CHECK AND TIGHTEN CENTRAL U-BOLTS SPRING | □ | □ | | □ |
| 3: CHECK AND TIGHTEN LOCK NUT SUPPORT SHAFT BEARING | □ | | | □ |
| 4: CHECK AND TIGHTEN BOLTS FASTENING CLAMPS LEAF SPRINGS | □ | | | □ |
| 5: CHECK RUBBER PADS FOR WEAR | | | | □ |
| 6: CHECK AND TIGHTEN SUSPENSION BOLTS AND NUT TO THE SPECIFIED TORQUE FROM TABLE 2. | □ | □ | | □ |
| 7: CHECK BUSHINGS FOR WEAR | | | | □ |

| U-BRACKET [MM] | KEY SIZE [MM] | TIGHTENING POINT [NM] |
|----------------|---------------|-----------------------|
| ∅ 18 | 27 | 250 ± 20 |
| ∅ 22 | 34 | 495 ± 45 |
| ∅ 24 | 35 | 550 ± 50 |
| ∅ 27 | 41 | 660 ± 60 |
| ∅ 30 | 46 | 950 ± 50 |

Table 1 Torque specification of the U-bolts axles bogie suspension

| BOLT SIZE | KEY SIZE [MM] | TIGHTENING POINT [NM] |
|-----------|------------------|--------------------------|
| M20 | 30 | 400 ±20 |
| M22 | 34 | 535 ± 25 |
| M24 | 36 | 690 ± 30 |
| M27 | 41 | 1005± 35 |

Table 2 Torque specification chassis bolts bogie suspension

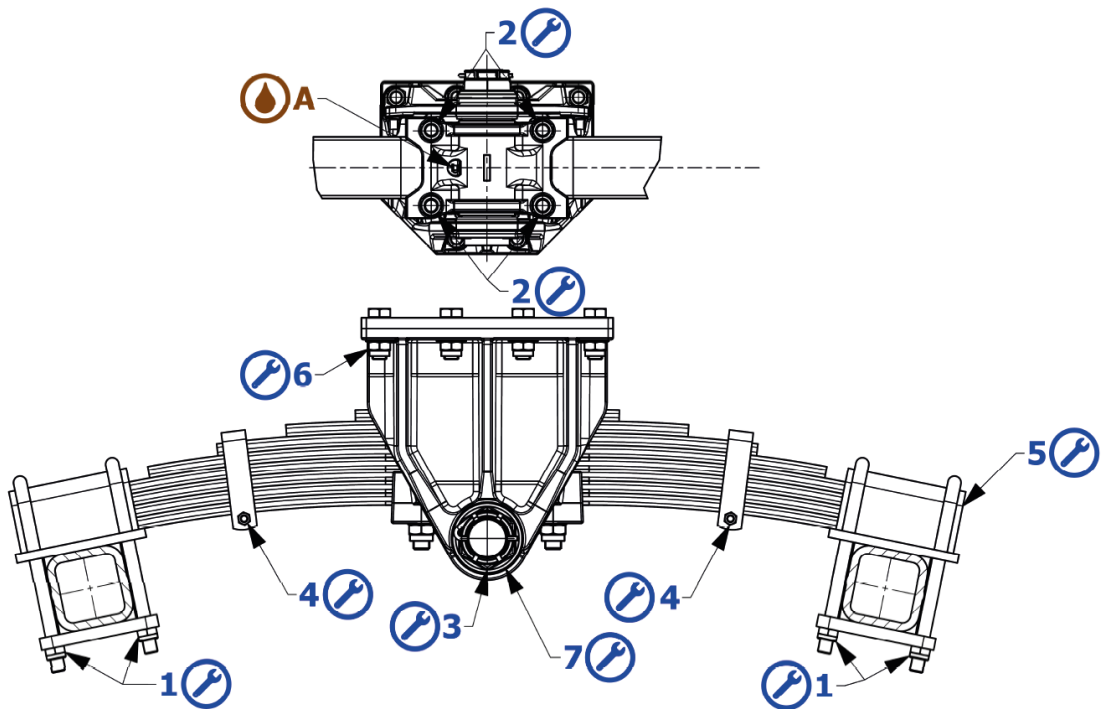
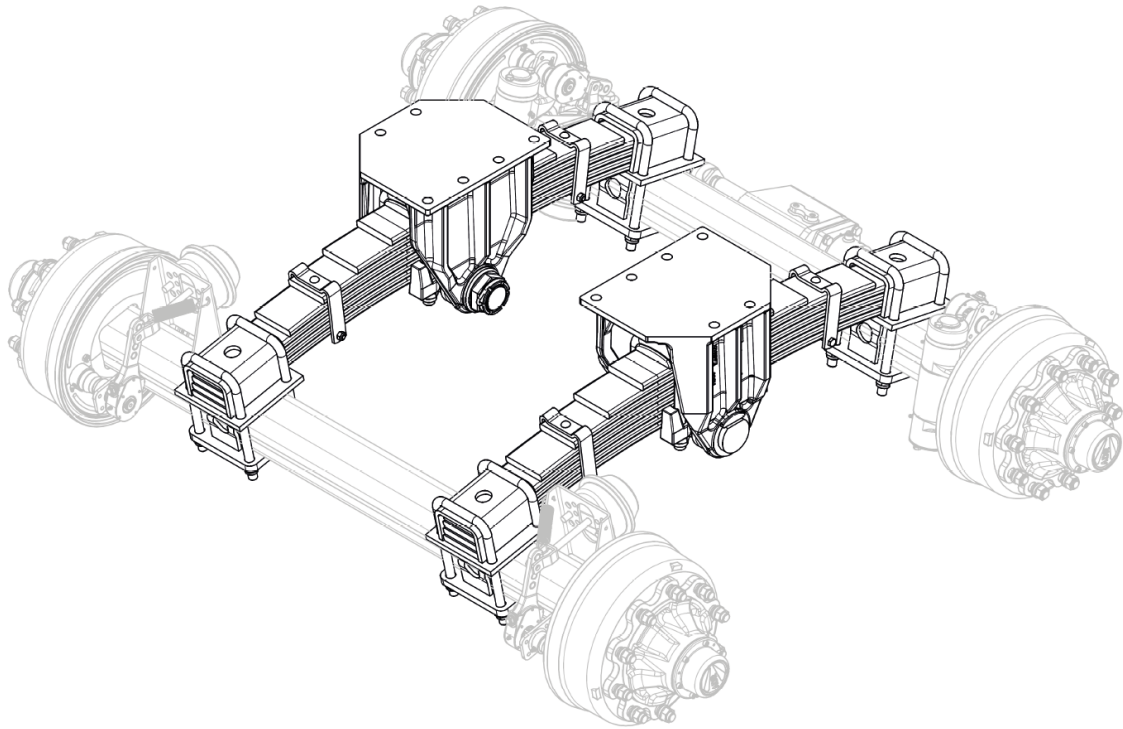


Figure 9-2 ADR/Colaert Bogie suspension series B/C/D/E/I/K/L

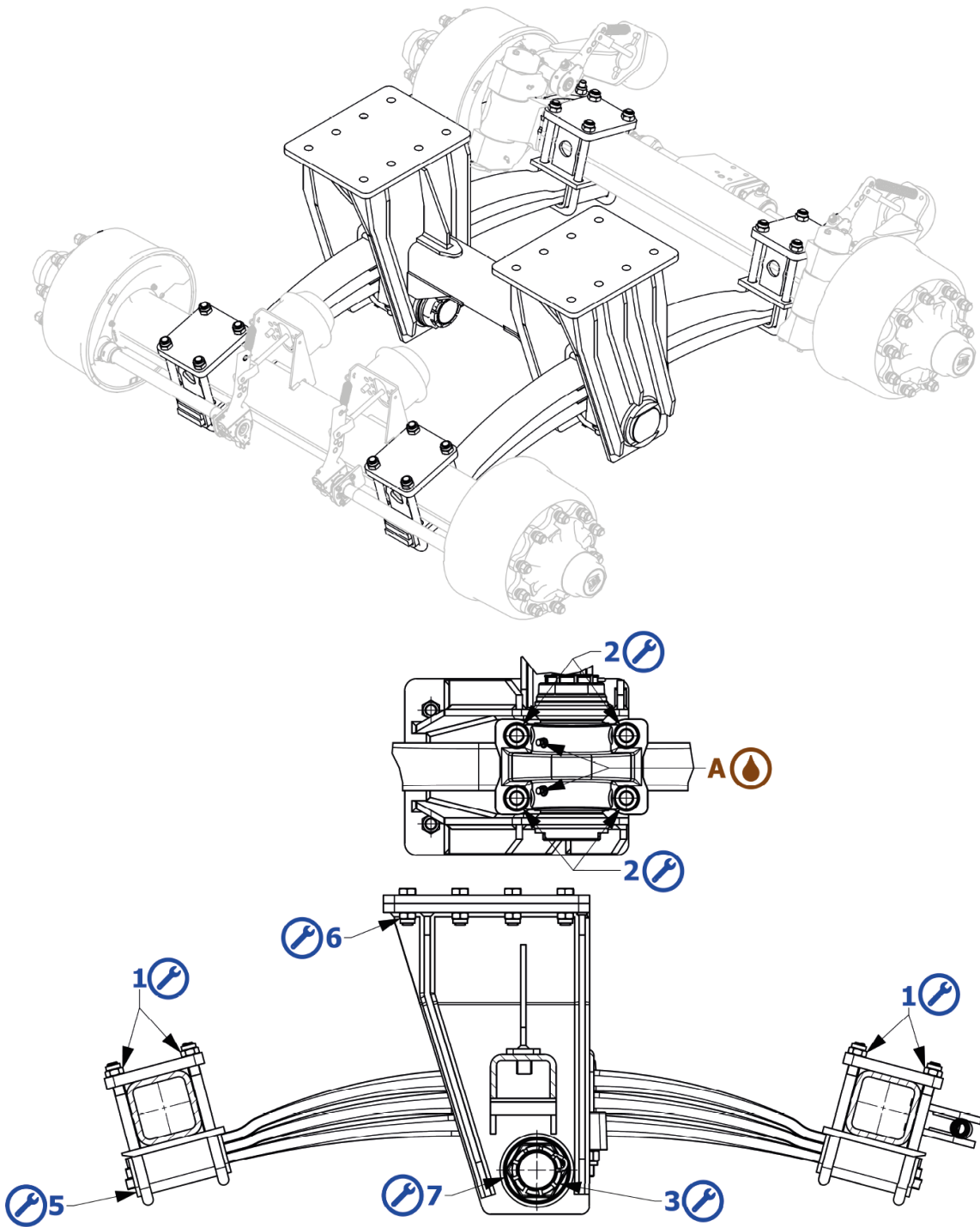


Figure 9-3 ADR/Colaert Bogie suspension, series A/X/Y

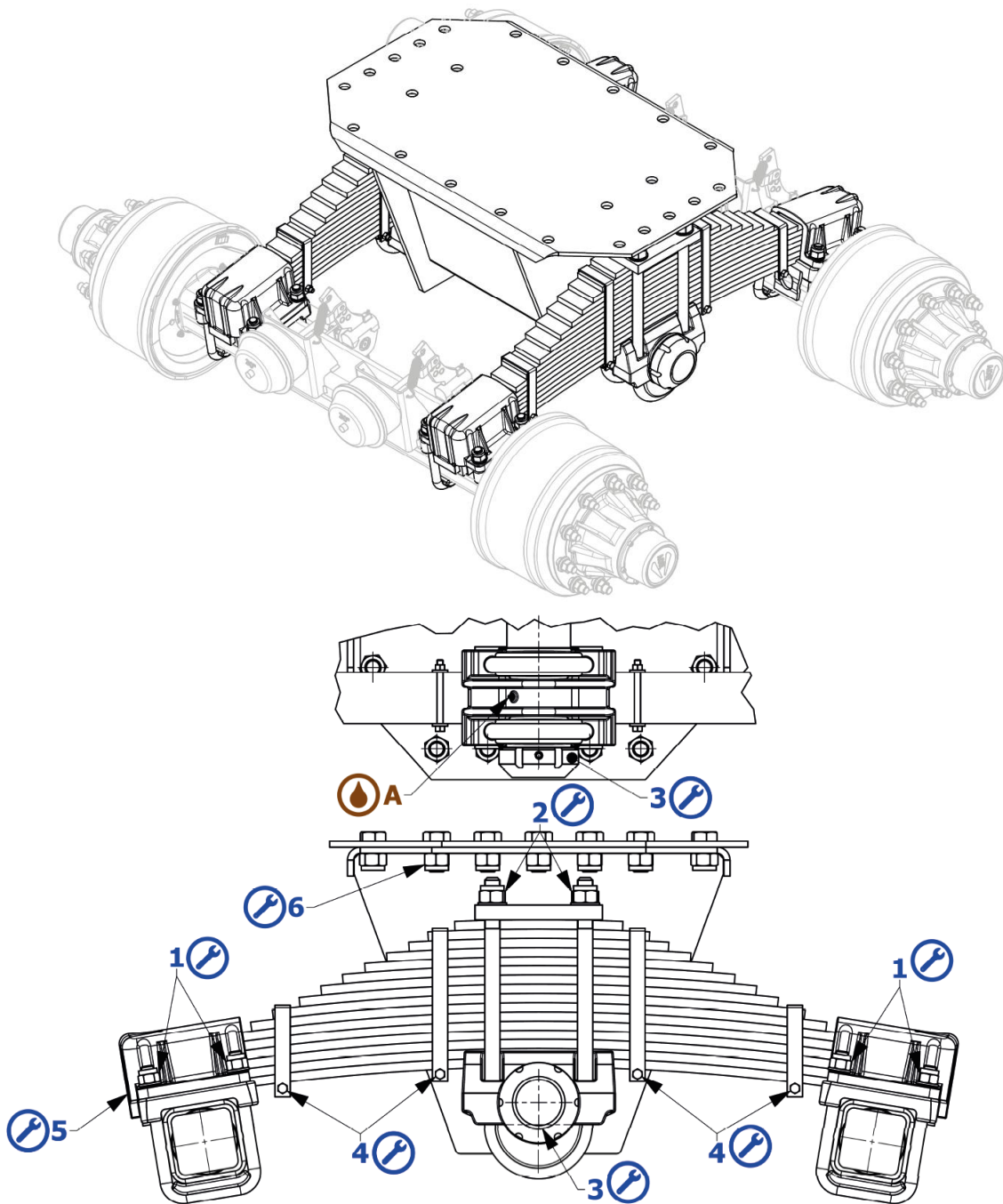


Figure 9-4 ADR/Colaert Bogie suspension series Z

9.2.2 Mechanical suspension tandem and tridem, series KB, KE and KW

The maintenance schedule for the mechanical tandem and tridem suspensions of ADR/Colaert can be found in the table below. The specific work is explained in the supplied manual of ADR/Colaert.

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN 10 KM | AFTER THE FIRST 500 HOURS OF USE OR THE FIRST 8500 KM | EVERY 500 HOURS OF USE OR 8500 KM | EVERY 1500 HOURS OF USE OR 25,000 KM |
|---|-----------------------------|---|-----------------------------------|--------------------------------------|
| <ul style="list-style-type: none"> ○ LUBRICATE □ MAINTENANCE WORK | | | | |
| LUBRICATING WITH GREASE: ADR LITOGREASE 3 | | | | |
| A: LIGHTLY LUBRICATE LEAF SPRING ENDS | ○ | | ○ | |
| MAINTENANCE WORK IN GENERAL | | | | |
| 0: VISUAL INSPECTION OF ALL COMPONENTS | | □ | | □ |
| 1: CHECK AND TIGHTEN U-BOLTS AXLE, SEE Table 3 FOR THE TORQUE SPECIFICATION. | □ | □ | | □ |
| 2: CHECK AND TIGHTEN CENTRAL BOLT PENDULUM ARM | | | | □ |
| M24 – 285 NM (270 – 300 NM) | | | | |
| 3: CHECK AND TIGHTEN BOLTS TRAILING ARM | | | | |
| KB&KE M24 – 110 NM (100 – 120 NM) | □ | | | □ |
| KW M16 – 185 NM (170 - 200 NM) | | | | |
| M30 – 750 NM (700 – 800 NM) | | | | |
| 4: CHECK AND TIGHTEN CLAMPING BOLTS TRAILING ARM | | | | □ |
| M12 – 90 NM (80 – 100 NM) | | | | |
| 5: TIGHTEN LEAF SPRING BOLTS | □ | | | □ |

| U-BRACKET [MM] | KEY SIZE [MM] | TIGHTENING POINT [NM] |
|----------------|---------------|-----------------------|
| ∅ 18 | 27 | 250 ± 20 |
| ∅ 22 | 34 | 495 ± 45 |
| ∅ 24 | 36 | 550 ± 50 |
| ∅ 27 | 41 | 660 ± 60 |
| ∅ 30 | 46 | 950 ± 50 |

Table 3 Torque specification U-bolts axles tandem and tridem suspension

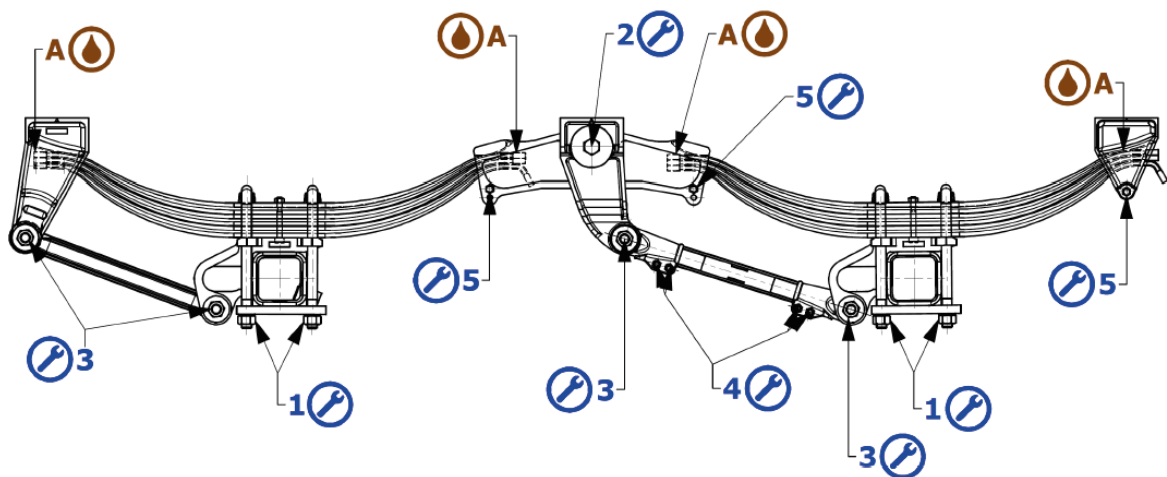
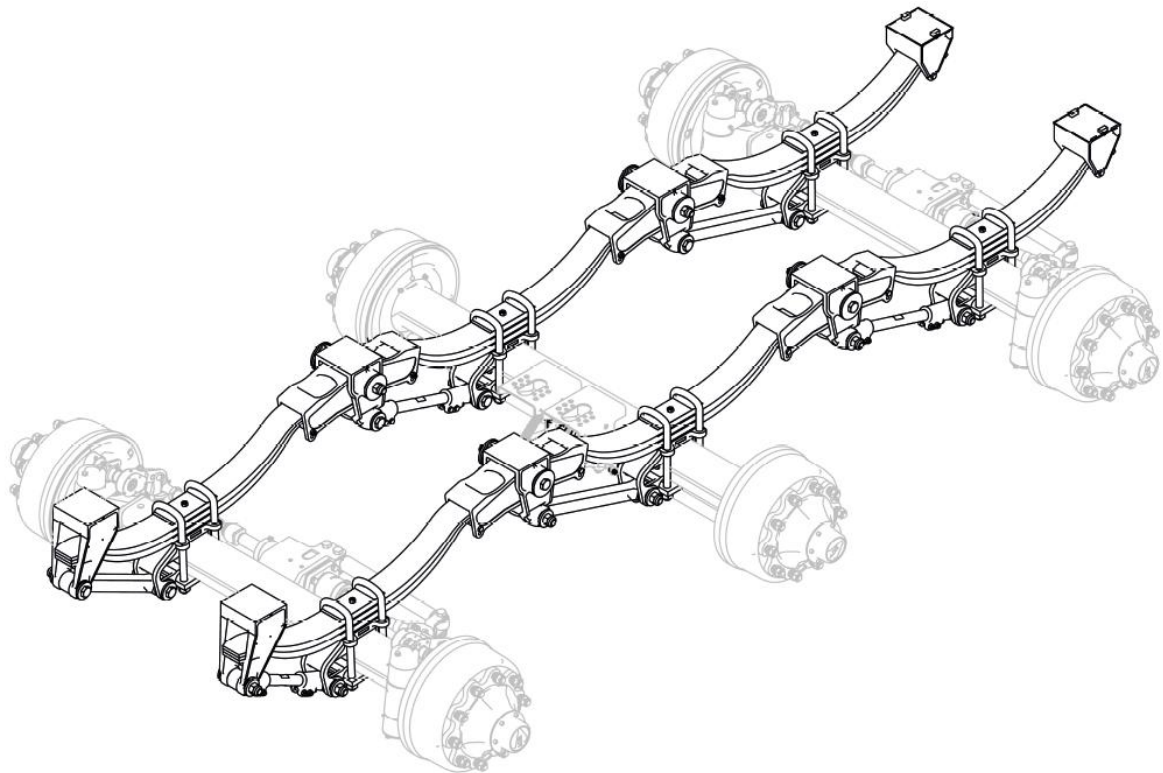


Figure 9-5 ADR/Colaert tandem and tridem suspension, series KB and KE

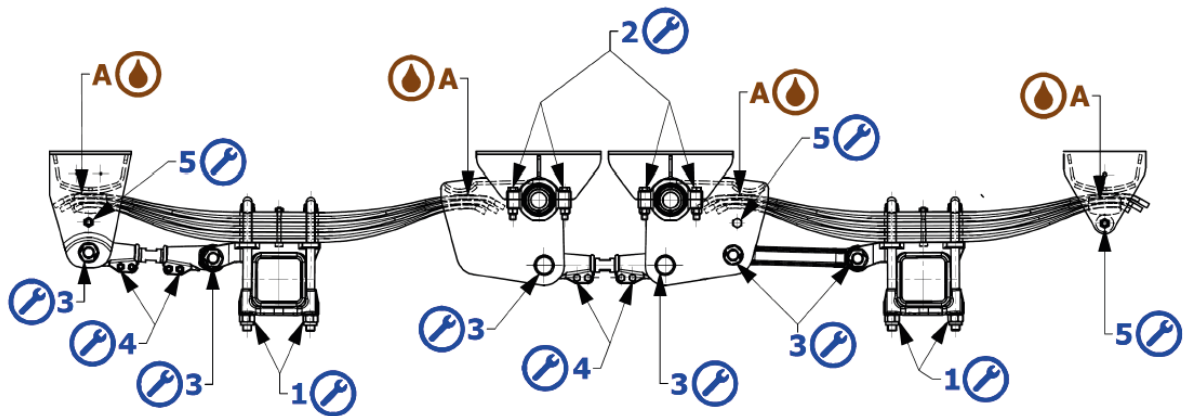
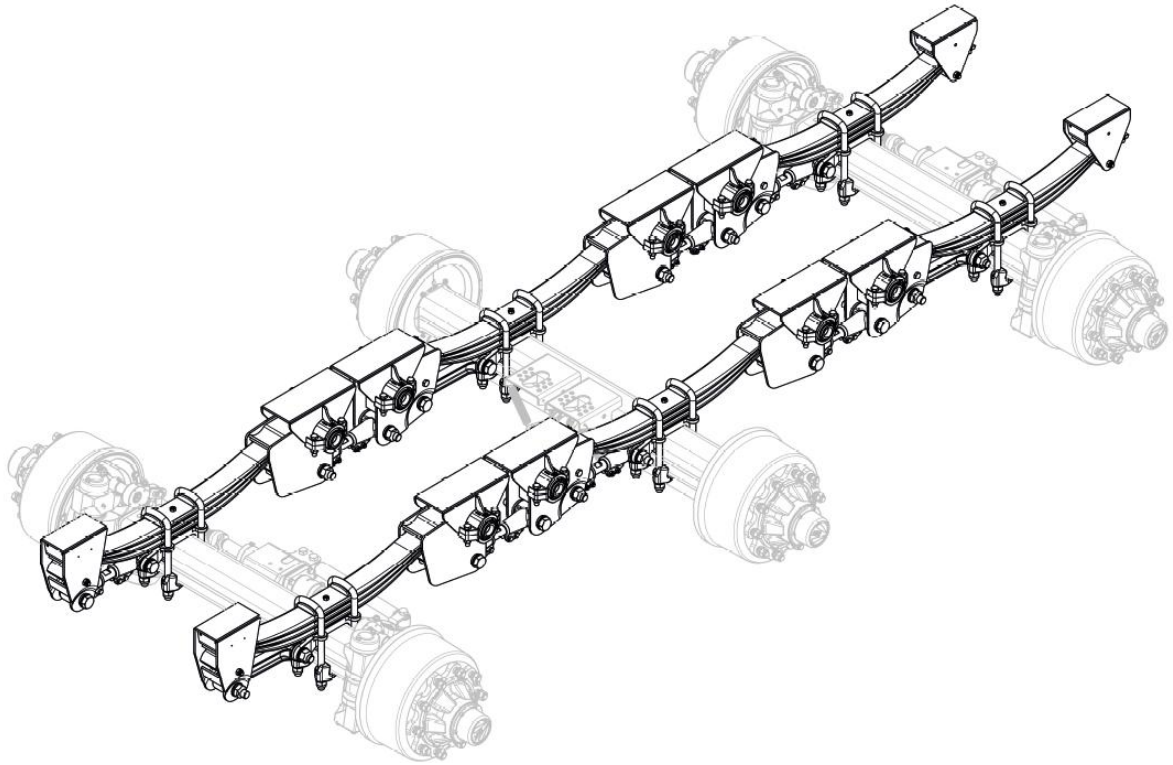


Figure 9-6 ADR/Colaert tandem and tridem suspension, KW series

9.2.3 Mechanical suspension tandem and tridem, series KC and KD

The maintenance schedule for the mechanical tandem and tridem suspensions of ADR/Colaert can be found in the table below. The specific work is explained in the supplied manual of ADR/Colaert.

| LUBRICATION POINTS AND MAINTENANCE WORK <input type="radio"/> LUBRICATE <input type="checkbox"/> MAINTENANCE WORK | AFTER THE FIRST LADEN 10 KM | AFTER THE FIRST 500 HOURS OF USE OR THE FIRST 8500 KM | EVERY 500 HOURS OF USE OR 8500 KM | EVERY 1500 HOURS OF USE OR 25,000 KM |
|--|-----------------------------|---|-----------------------------------|--------------------------------------|
| LUBRICATING WITH GREASE: ADR LITOGREASE 3 | | | | |
| A: LIGHTLY LUBRICATE LEAF SPRING TIPS | <input type="radio"/> | | <input type="radio"/> | |
| B: LUBRICATE THE SWIVEL AXLES OF THE PENDULUM ARMS | <input type="radio"/> | | <input type="radio"/> | |
| GENERAL MAINTENANCE WORK | | | | |
| 0: VISUAL INSPECTION OF ALL COMPONENTS | | <input type="checkbox"/> | | <input type="checkbox"/> |
| 1: CHECK AND TIGHTEN AXLE U-BOLTS, SEE Table 3 FOR TORQUE SPECIFICATION. | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| 2: TIGHTEN BOLT CENTRAL PENDULUM AXLE TO A MAXIMUM CLEARANCE OF <u>1 MM</u> | | | | <input type="checkbox"/> |
| 3: TIGHTEN LEAF SPRING BOLTS TO A MAXIMUM CLEARANCE OF <u>1 MM</u> | | | | <input type="checkbox"/> |
| 4: TIGHTEN LEAF SPRING CARRYING BOLTS | <input type="checkbox"/> | | | <input type="checkbox"/> |

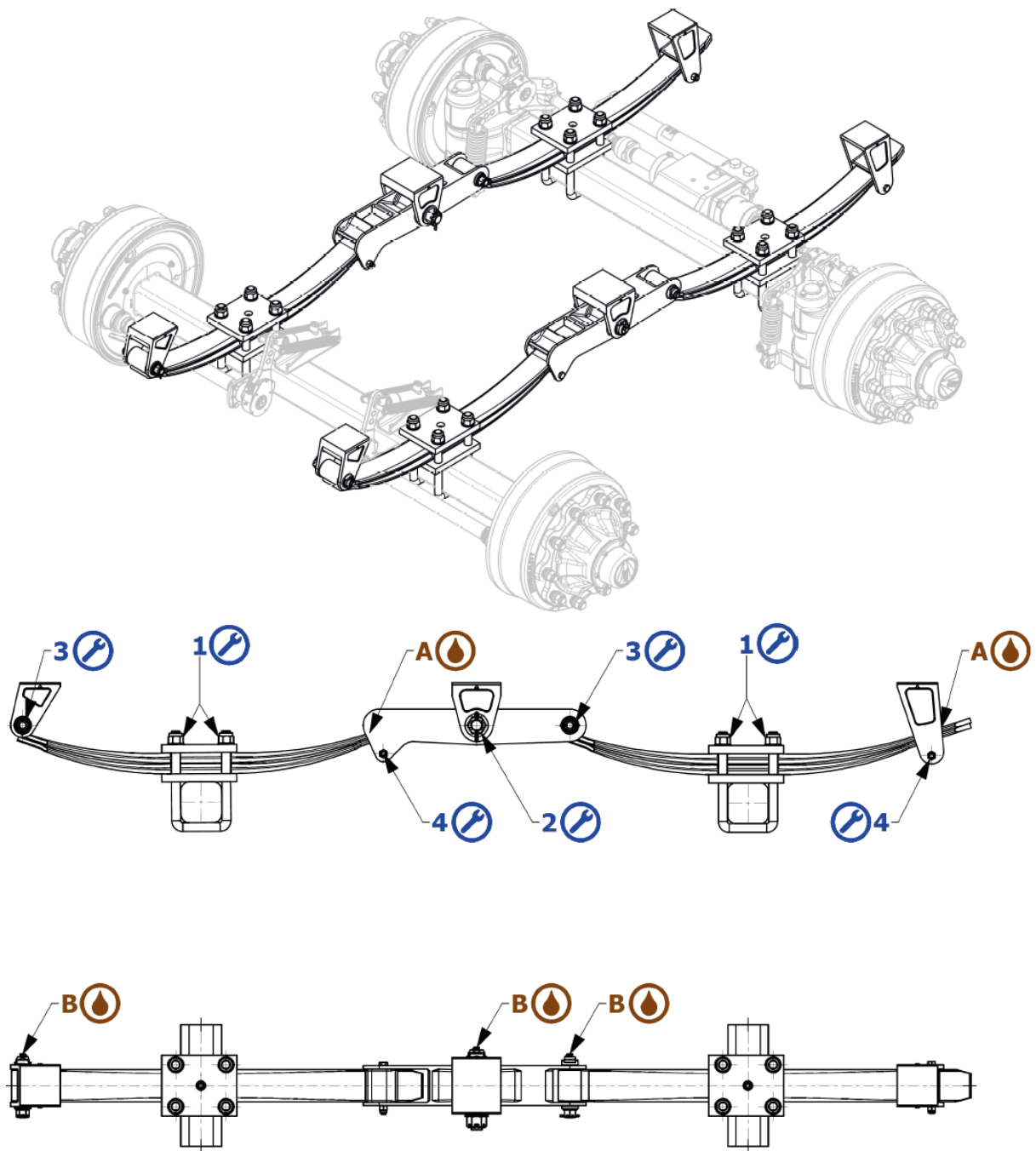


Figure 9-7 ADR/Colaert tandem and tridem suspension, series KC and KD

10. Aligning axles

It is important that the axles under the towed vehicle are correctly aligned. These should always be aligned with the drawbar eye. Alignment can be performed with simple measuring tools, as seen in Figure 10-1, but laser equipment is recommended. With the help of laser equipment, alignment can be carried out faster and more accurately.

Alignment with simple measuring tools must be carried out using the following steps:

- Start by aligning the rigid (unsteered) axle(s) under the machine.
- Measure the distance from the drawbar eye to two fixed points left and right on the axle, distance C in Figure 10-1. The hub cap is often used for this purpose, but any fixed point on the shaft can serve as a measuring point. Note that this point must be present both on the left and right side of the axle in the same position to form a good reference point.
- Adjust the position of the axle until the distance from the drawbar eye is equal to both reference points.
- Check that the axle is positioned as perpendicular as possible to the chassis sleeves. This can be done by measuring distance A, as seen in Figure 10-1. This distance must be the same on the left and right sides of the chassis.
- When the rigid axle(s) are correctly aligned, they can be used as a reference point with which the steering axles can be aligned.
- Measure the distance between the rigid axle and the steered axle, distance B in Figure 10-1. This distance must be the same on the left and right.
- Distance A can then be measured for this steered axle to check if the axle is positioned in the middle of the chassis.

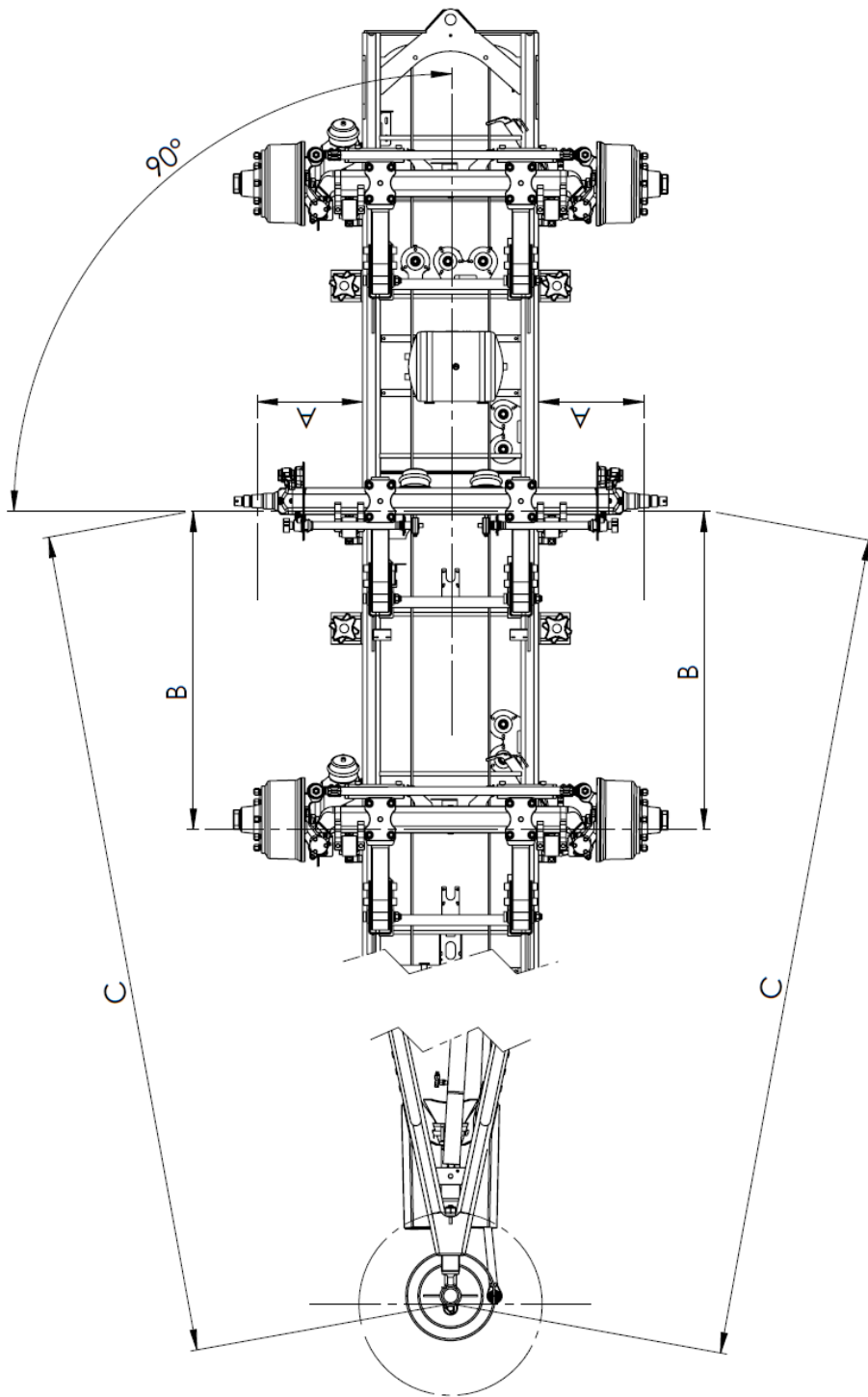


Figure 10-1 Align rigid axis with simple measuring tool

11. Forced hydraulic steering system

Peecon machines, equipped with a hydraulic steering system, can be equipped with several variants of these steering systems. The specific variant will depend on the number of steered axles on the machine.

A general overview of the different hydraulic steering system components on the chassis can be seen in Figure 11-1 and Figure 11-2. In a hydraulic steering system, each steered axle is controlled by its own command cylinder (1). This cylinder is connected to the steering rod (3) attached to the tractor by means of a tilting mechanism (2).

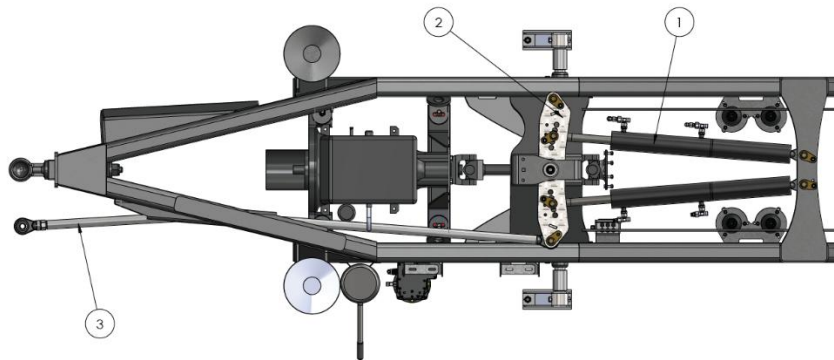


Figure 11-1 Steering system on a machine with two hydraulically steered axles

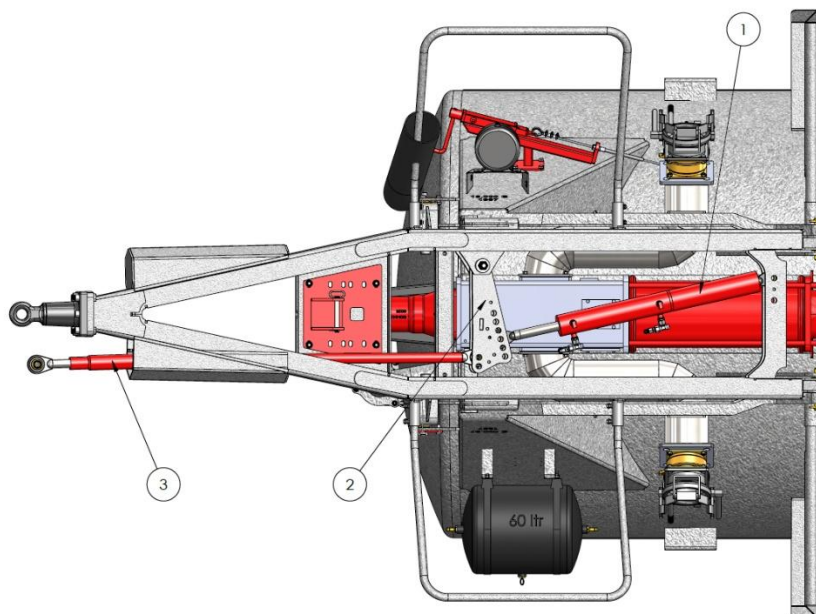


Figure 11-2 Steering system on a machine with one hydraulically steered axle

11.1 Hydraulic connection

The steering function of the hydraulically steering system does not use the hydraulic connections on the tractor. The towed vehicle only needs to be coupled to the towing and steering coupling of the tractor in order for the steering system to function, see chapter 4 for more information about these couplings.

11.2 Electrical connection

The electrical connection is not necessary for the functioning of a Peecon hydraulic steering system.

12. Maintenance forced hydraulic steering system

12.1 Maintenance schedule forced hydraulic steering system

In order for your machine to function optimally and to guarantee a long service life, it is important that the maintenance is carried out in a timely and correct manner. Below is the maintenance schedule of the forced hydraulic steering system. On the basis of this diagram it is easy to see when which activities need to be carried out and when which components need to be lubricated. The specific work will be explained below.

| LUBRICATION POINTS AND MAINTENANCE WORK | AFTER THE FIRST LADEN RIDE | DURING COUPLING | AFTER 40 HOURS OF USE | AFTER EVERY 200 HOURS OF USE OR 6 MONTHS | AFTER EVERY 500 HOURS OF USE OR ANNUALLY |
|---|----------------------------|-----------------|-----------------------|--|--|
| <ul style="list-style-type: none"> ○ LUBRICATE □ MAINTENANCE WORK | | | | | |
| LUBRICATE WITH EP 3 GREASE | | | | | |
| 1: STEERING AND COMMAND CYLINDER(S) ROD ENDS | | | ○ | | |
| 2: CENTRAL TILTING MECHANISM | | | | ○ | |
| MAINTENANCE WORK | | | | | |
| 1: CHECK HYDRAULIC SYSTEM | | | | | □ |
| 2: CHECK FLUID LEVEL HYDRAULIC RESERVOIR | □ | □ | | □ | |
| 3: CHECK CLEARANCE PINS AND BUSHINGS | | | | | □ |
| 4: CHECK STEERING SYSTEM AND PERFORM THE ALIGNMENT PROCEDURE IF NECESSARY | □ | | | □ | |
| 5: CHECK STEERING ROD LENGTH | | □ | | □ | |

Table 4 Maintenance schedule hydraulic forced steering system

12.2 Lubricating rod ends

It is possible that your machine is equipped with maintenance-free rod ends on the steering rods and command cylinder(s). In this case, it is not necessary to lubricate these. Always check that all the articulated eyes in the steering are actually maintenance-free before skipping this step.



Figure 12-1 A rod end with lubrication point

If the rod ends on your machine are equipped with a grease nipple, as seen in Figure 12-1, it is important that all rod ends are lubricated according to the prescribed maintenance interval. The rod ends that need to be checked can be found at both ends of the steering rod and at both ends of the command cylinder(s).

12.3 Lubricating central tilting mechanism

The central tilting mechanism needs to be regreased after every 200 hours of use or every 6 months, whichever is reached first. The lubrication point can be found in the middle of the tilting mechanism, on the outside of the bushing, often facing to the rear of the vehicle, on the same side as the command cylinder(s), as seen in Figure 12-2.

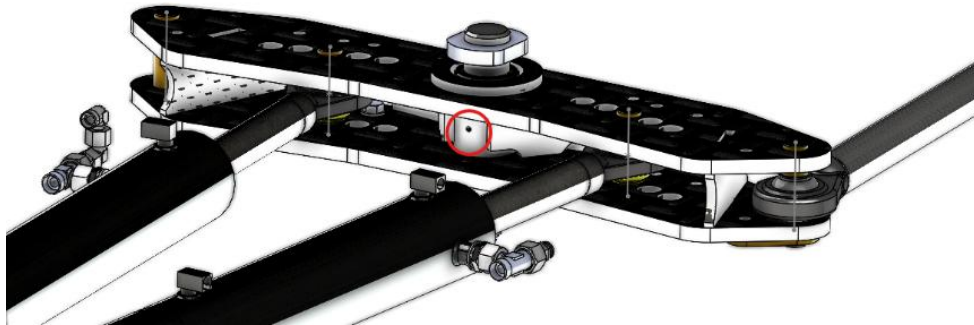


Figure 12-2 Grease point on the tilting mechanism of a Peecon hydraulic steering system with two axles.

12.4 Checking the hydraulic system

The check of the hydraulic system consists of a visual checking procedure where the general state of the system is assessed and a functional checking procedure where the hydraulic steering system and the various components are tested to determine whether they still function properly.

During the visual inspection, all lines, hoses and cylinders must be checked for signs of leaks, wear or damage. Also pay attention to the age of the hydraulic hoses and replace them at least every 7 years. The rods of the hydraulic cylinders must also be assessed for damage and cleared of contamination.

During the functional check, the hydraulic system needs to be pressurised by means of the hand pump, see 13.4.1. During this step the steering and command cylinders are tested, to see whether they can still build up sufficient pressure. Move the tilting piece by hand and check that the system is building up pressure and that this pressure remains constant.

The pre-fill pressure of the accumulators must also be checked to assess whether they still meet the specifications. The pre-fill pressure is the pressure in the nitrogen chamber of the membrane accumulator. This pressure must be measured and if necessary refilled with **nitrogen**. This requires specialist tools and must be performed by an expert. This pre-fill pressure needs to be 100 bar.

12.5 Control fluid level hydraulic reservoir

The hydraulic reservoir must always contain sufficient fluid. If this is not the case, air can be introduced into the hydraulic lines during pressure pumping of the steering system, which means that the entire system will have to be vented. It is therefore important to always check the fluid level in the hydraulic reservoir before pumping the steering system at pressure.

12.6 Control play pins and bushings

The clearance on all pins and bushings of the steering system must be checked every year or every 500 operating hours, whichever is reached first. The pins must have an ISO transitional fit. This means that the pins should not have any noticeable play.

Excessive clearance negatively affects the lifespan and functioning of the steering system, resulting in increased machine wear, fuel consumption and maintenance costs.

13. Align forced hydraulic steering system

13.1 When is steering system alignment necessary?

Alignment of a steered towed vehicle is part of the periodic maintenance. Due to normal use, it is possible that a deviation in the steered axles will occur over time. This results in increased rolling resistance, resulting in higher tyre wear and fuel consumption. In extreme cases, the towed vehicle may no longer follow in line with the tractor. When one of these symptoms is detected, it is time to align your vehicle's steering system.



WARNING! *The alignment of the vehicle can have negative affect the driving and braking behaviour of the towed vehicle when it is no longer within specification. It is therefore advisable to check the steering system of the towed vehicle regularly and align it if necessary.*

13.2 Adjusting steering rod

Hook up the machine behind the tractor and drive several meters (30 m) ahead in a straight line before measuring and adjusting the steering rod. The length of the steering rod must be adjusted so that the tilting mechanism (2) from Figure 11-1 at a right angle to the direction of travel. This can be checked by measuring the length of the command cylinders, see Figure 13-1.

This can be checked by performing the following procedure:

- Hook up the trailer behind the towing vehicle.
- Place the trailer directly behind the towing vehicle, by driving a few meters (approximately 30 m) straight ahead.
- Secure the towing vehicle so that it cannot roll or drive away unexpectedly.
- Check the length of the command cylinder in this condition. The bar length shall be $175 \text{ mm} \pm 20 \text{ mm}$, as shown in Figure 13-1. Change the length of the steering rod until the command cylinder is extended to the correct position.

During the first use of the trailer, or when another towing vehicle is used, the following procedure must be followed:

- Check the extension length of the command cylinder while driving straight ahead, according to the above mentioned steering rod adjusting procedure.
- Slowly steer the towing vehicle until the angle between the trailer and the towing vehicle is approximately 45° .
- Check the extension length of the command cylinder and verify that the command cylinder is not nearing its (internal) end stops. Depending on the steering direction, the command cylinder will be pushed in or out. The maximum extension of the cylinder is 350 mm and the minimum is 0 mm. Check the result and verify that the command cylinder has not yet reached these extension values. If the command cylinder is nearing its end stop the pin position in the central tilting mechanism needs to be adjusted by moving the pin of the command cylinder rod end to a hole closer to the centre of the tilting mechanism.
- Continue steering slowly until the rear tyre of the towing vehicle touches the drawbar. The command cylinder should still have an approximate clearance of 20 mm up to the maximum or minimum extensions. Check this by measuring the extension length of the command cylinder.



Figure 13-1 Extension length of the command cylinder in the neutral steering position



WARNING! To prevent damage to the steering system, the steering rod length should be checked each time the towed vehicle is coupled. This applies in particular to the coupling behind another/new tractor.

13.3 Workings of the Pecon hydraulic steering system

The Figure 13-2 ball valves (A1, A2, C1 and C2) are shown in their respective positions on the vehicle. These will always be mounted in the direct vicinity of the hand pump (1). The mounting position on the vehicle can be either on the left or right, near the front. The pressure gauge (2) can also be seen, which can be used to read the hydraulic pressure in the steering system. Optionally, the machine can also be equipped with an automatic lubrication system (3), see chapter 6 for more information about the automatic lubrication system.



WARNING! The ball valves are closed when the handle is perpendicular to the pipe and open when the handle is parallel to the pipe.

The ball valves are purposefully mounted on the vehicle with two different orientations:

- The vertically mounted ball valves (C1, C2, C...) connect the hydraulic system to the hand pump.
- The horizontally mounted ball valves (A1, A2, A...) connect the piston and rod sides of the individual steering and command cylinders per steered axle.

The workings of the hydraulic system can be seen in Figure 13-7. This hydraulic diagram shows the steering system of a machine with two steered axes. This diagram also shows the workings of the ball valves. Valves C1 and C2 are the vertically mounted ball valves that connect the hand pump to the rest of the system. Valves A1 and A2 are the horizontally mounted ball valves that connect the piston and rod sides of the steering and command cylinders.

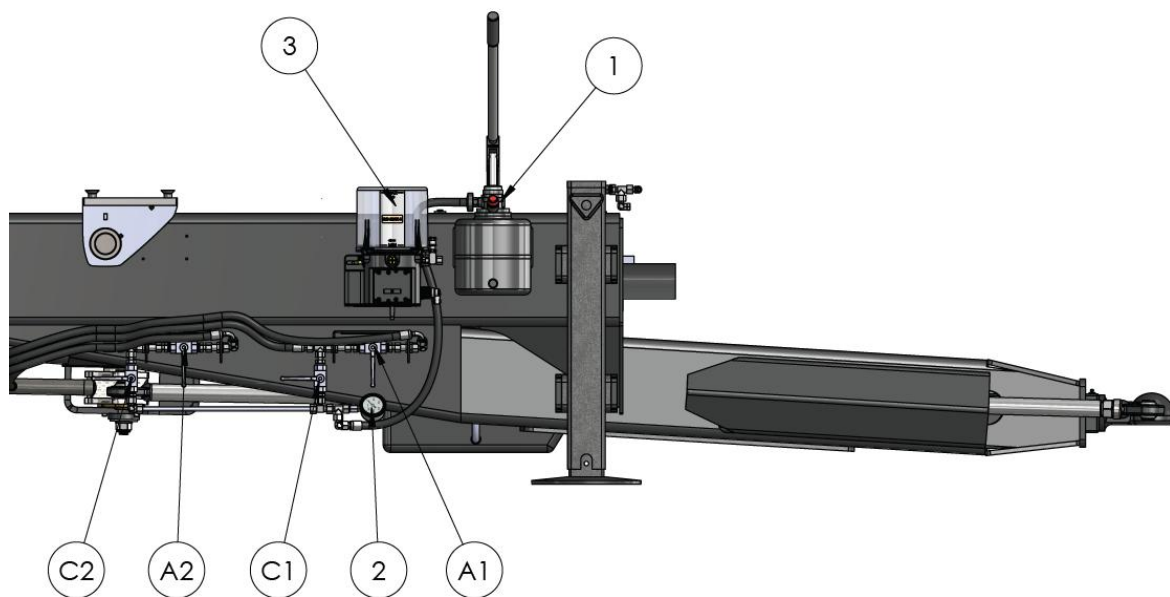


Figure 13-2 Position of ball valves on the vehicle

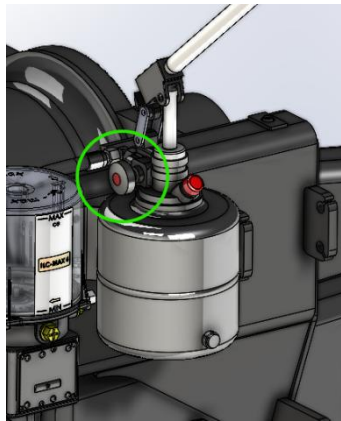


Figure 13-3 Position pressure release valve on the hand pump

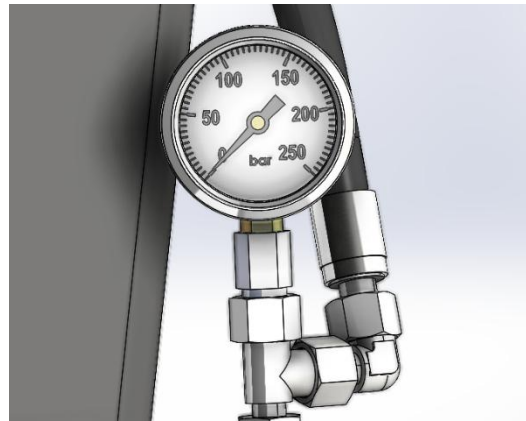


Figure 13-4 Pressure gauge

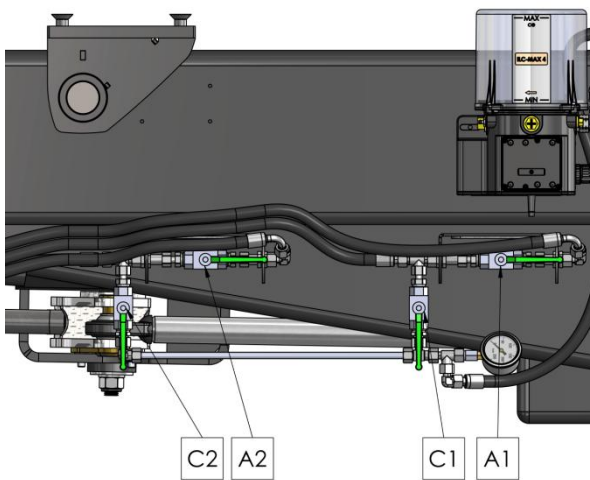


Figure 13-5 Valves open

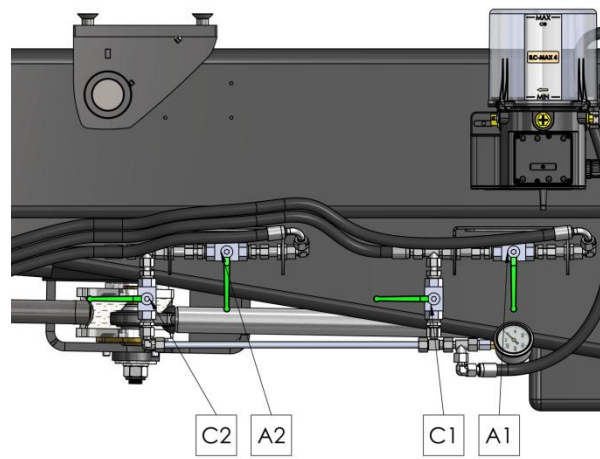


Figure 13-6 Valves closed

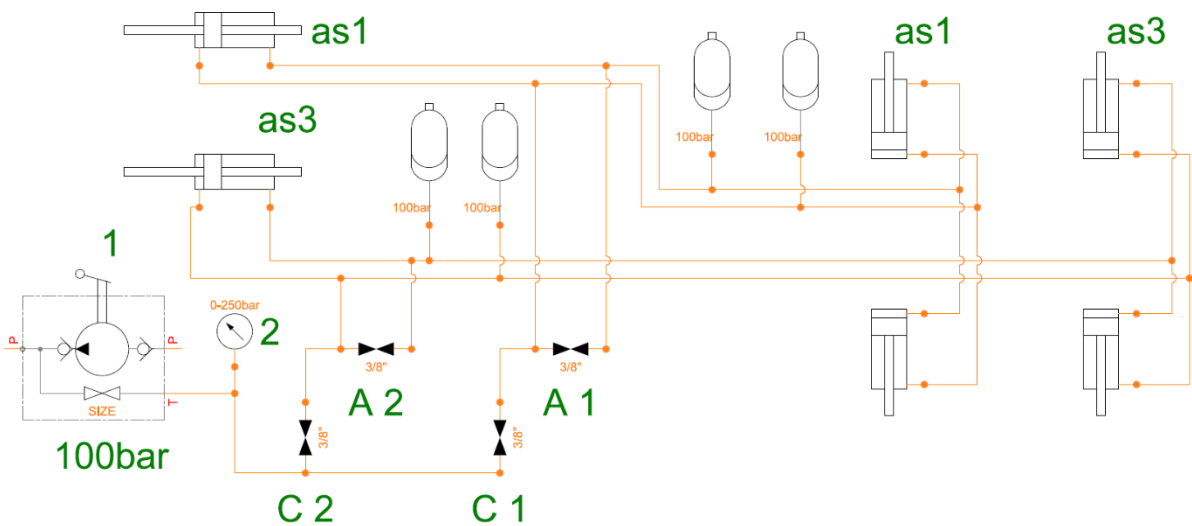


Figure 13-7 Schematic overview of the hydraulic steering system of a machine with two steered axles

13.4 Alignment procedure forced hydraulic steering system

In order for the forced hydraulic steering system to function properly, it is important that the system is properly aligned and pressurised. Both actions can be performed together or separately from each other. When both actions are performed, it is important that the correct order is followed. Always start by checking the hydraulic pressure on the system and refilling if necessary, before aligning the system.

13.4.1 Hydraulic pressure

To check whether refilling the hydraulic pressure of the forced hydraulic steering system is necessary, the following procedure can be performed:

1. Check and verify that all ball valves are fully closed. Ball valves are closed when the handles are perpendicular to the line, see Figure 13-6.
2. Check the fluid level in the hydraulic reservoir of the hand pump and, if necessary, refill the reservoir to the maximum fluid level.
3. Pump with the hand pump until the pressure gauge indicates 100 bar, the pressure gauge can be found in different places on the vehicle, see Figure 13-4. The specific position of the pressure gauge depends on the vehicle, but it will always be mounted on the outgoing pipe of the hand pump.
4. The next step is to open the vertical (C1, C2, C...) ball valves. The ball valves are open when the handle is parallel to the pipe, see Figure 13-5.
5. Check if the pressure on the pressure gauge changes. When the pressure remains the same, it is not necessary to refill the hydraulic pressure in the steering system. If the pressure gauge indicates a pressure drop, the system needs to be repressurised. In this case, increase the pressure in the hydraulic system by means of the hand pump until the pressure gauge reads a pressure of 100 bar.
6. Then close the vertical (C1, C2, C...) ball valves and verify that all ball valves are closed. Ball valves are closed when the handles are perpendicular to the line, see Figure 13-6.
7. When all valves are closed, the remaining pressure at the hand pump can be released by turning the rotary knob to the left of the handle, see Figure 13-3.

13.4.2 Align steering forced hydraulic steering system

1. Check and verify that all ball valves are closed.
2. When the towed vehicle is equipped with hydro-pneumatic suspension, it is important that the ride height is set correctly. Check that all hydraulic suspension cylinders on the towed vehicle are extended approximately 100 mm. This can be checked by measuring the length of the cylinder shaft (the blank metal).
3. Open the horizontal (A1, A2, A...) ball valves of the towed vehicle and drive approximately 30 meters forward in a straight line. The valves are open when the handle is parallel to the line, see Figure 13-5.
4. Check the command cylinders. These should be extended approximately 175 mm. To check the extension of the command cylinder, measure the length of the blank metal on the rod of the hydraulic cylinder. If the cylinders are not extended sufficiently or too much, the length of the steering rod must be adjusted to move the command cylinder(s) to the desired extension length.
5. The next step is to close all horizontal (A1, A2, A...) ball valves to the towed vehicle. Ball valves are closed when the handles are perpendicular to the pipe, see Figure 13-6.
6. When all valves are closed, the residual hydraulic pressure in the hydraulic system can be released by turning the rotary knob to the left of the handle of the hand pump, see Figure 13-3.



WARNING! Before driving off after performing the alignment procedure, verify that all ball valves are closed. If this is not the case, the system will not steer and the alignment procedure must be repeated. Ball valves are closed when the handles are perpendicular to the line, see Figure 13-6.

13.5 Bleeding the hydraulic steering system

In order to bleed the hydraulically steering system, the following procedure must be followed:

- Open the bleed valves on the command cylinder(s), see Figure 13-8. Please note, the bleed valves must always be placed at the top of the command cylinder(s), otherwise they cannot be bled properly!
- Open the bleeding valves on the steering cylinder(s) of the steered axle(s).
- Open the **horizontal** and **vertical** ball valves on the towed vehicle, see Figure 13-5. The valves are open when the handles are parallel with the lines.
- Check and verify that the hydraulic reservoir at the hand pump is filled to the maximum.
- Use the hand pump to pump hydraulic oil into the steering system and pay attention to the bleed valves of the command cylinder(s) and steering cylinder(s). The bleed valves can be closed when hydraulic oil starts to come out. Continue this procedure until all bleed valves are closed. While pumping, keep an eye on the fluid level in the hydraulic reservoir and do not let it fall below the minimum.
- When all the bleed valves are closed and the fluid level in the hydraulic reservoir is checked, the pressure in the hydraulic system can be increased by means of the hand pump. Keep adding pressure by using the hand pump until the pressure gauge reads 100 bar, see chapter 13.4.1 for more information about pressurising the steering system.
- Close all ball valves, see Figure 13-6, and perform the steering alignment procedure, see chapter 13.4.2 for more information on steering system alignment. The ball valves are closed when the handle is perpendicular to the line.

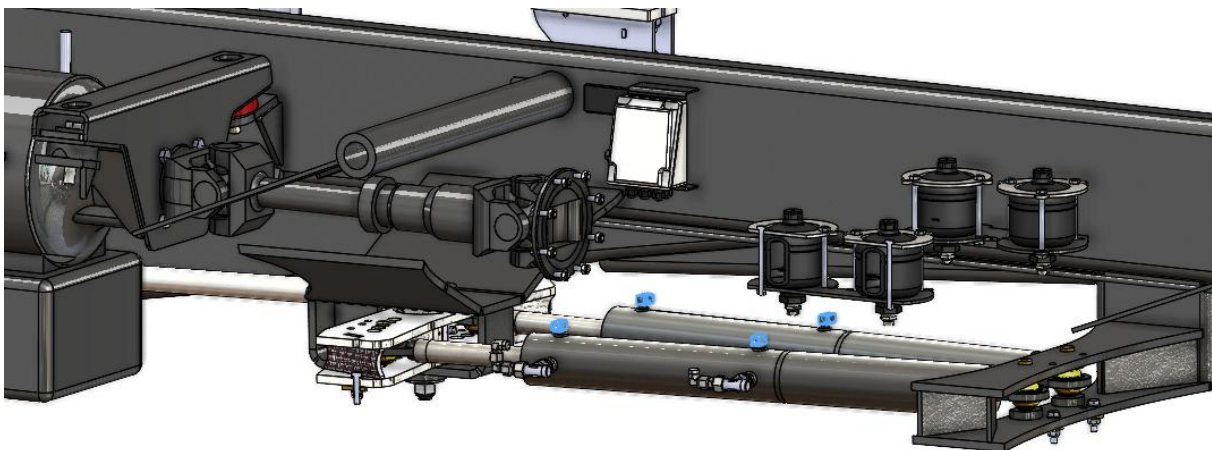


Figure 13-8 Vent openings Command cylinders

14. Malfunctions forced hydraulic steering system

If your machine has a problem that does not appear in the table below or the problem cannot be solved by means of the mentioned solution, please contact your dealer or Peeters Agricultural Machinery.

| Malfunction | Cause | Solution |
|---|---|--|
| The steered axles no longer steer when stationary and/or at low speeds (<5 km/h). | Insufficient pressure in the hydraulic system. | Perform the steering system alignment procedure, see 13.4. |
| | The ball valves are not (all) (fully) closed after the alignment procedure. | |
| | Insufficient fluid in the hydraulic system. | The need to refill the hydraulic system is unusual, so check the system for leaks and repair them if present. Then refill the hydraulic fluid, bleed the system and perform the alignment procedure, see 13.4. |
| Only one or a couple of the steered axles respond to the steering input. | Damage to a command cylinder(s) | The machine is used with an incorrect steering rod length, which causes damage the command cylinder and now the cylinder needs to be replaced. Please contact your dealer or Peeters Landbouwmachines B.V. for a replacement cylinder. |
| | Insufficient pressure in the hydraulic system. | Perform the steering system alignment procedure, see 13.4. |
| | Insufficient fluid in the hydraulic system. | Fill the hydraulic fluid, bleed the system and perform the steering system alignment procedure, see 13.4. |
| The axles still steer, but no longer achieve the desired steering angle. | Damage to a command cylinder | The machine is used with an incorrect steering rod length, which causes damage the command cylinder and now the cylinder needs to be replaced. Please contact your dealer or Peeters Landbouwmachines B.V. for a replacement cylinder. |
| | Insufficient pressure in the hydraulic system. | Perform the steering system alignment procedure, see 13.4. |
| | Insufficient fluid in the hydraulic system, due to a leakage. | Check the system for leaks and repair them if present. Then refill the hydraulic fluid, bleed the system and perform the alignment procedure, see 13.4. |

| | | |
|---|--|---|
| The alignment of the towed vehicle deviates, causing it to no longer follow the tractor a straight line. | Steered axles are no longer correctly aligned. | Perform the steering system alignment procedure. |
| | The steering rod is not adjusted correctly. | Avoid sharp steering angles and perform the alignment procedure as soon as possible to prevent damage to your machine's steering system. |
| | The alignment of the axles is no longer correct. | Alignment of the steering system alone is not sufficient, the axles themselves must also be aligned, see chapter 10. |
| After performing the alignment procedure, the towed vehicle steers well, but after a short time the system has problems again. | The hydraulic system has a leak. | Clean all hydraulic components properly, especially couplings, actuators and cylinder rods. Then perform the alignment procedure (see 13.4) when steering performance decreases and check the system for visible indicators of hydraulic leaks. |

15. Mobil Elektronik steering system

The Mobil Elektronik steering system uses a steering angle sensor. This sensor is mounted on the drawbar, on the left or right next to the drawbar eye. This sensor measures the angle between the towed vehicle and the tractor and will control the steered axles of the towed vehicle based on this angle and vehicle speed.

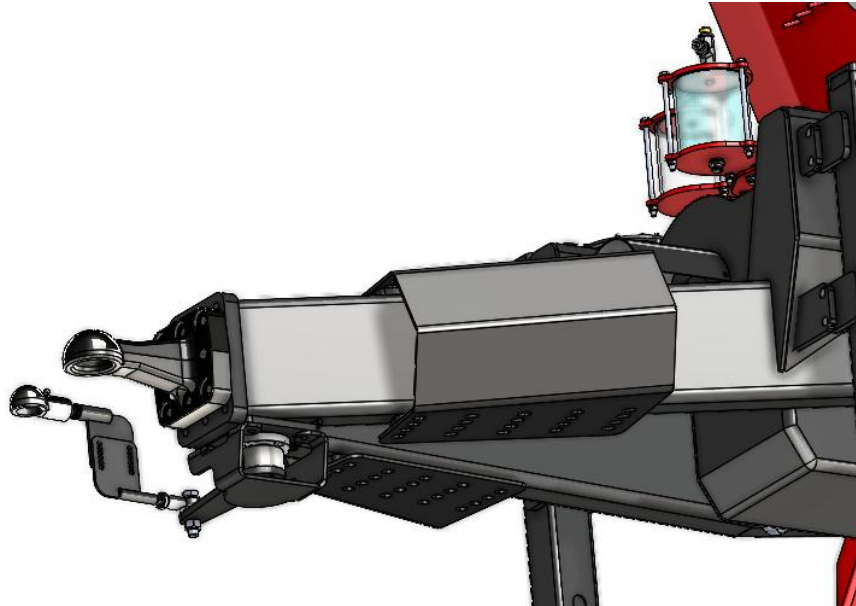


Figure 15-1 Steering angle sensor on the drawbar

15.1 Hydraulic connection

The Mobil Elektronik steering system uses the hydraulic system of the tractor and will therefore need a pressure, return and possibly Load-Sense connection in order to function.



WARNING! The electronic steering system requires a hydraulic pressure line with a minimum flow rate of 70 l/min.

15.2 Electrical connection

Nowadays, most tractors are equipped with an ISOBUS connection. The Mobil Elektronik steering system can be powered directly from this connection.

For tractors that are not equipped with an ISOBUS connection or an ISOBUS that cannot provide sufficient electrical power, an external 12 V electrical connection is necessary for the Mobil Elektronik steering system to function. For this purpose, a dedicated power cable directly from the battery is recommended. This cable connects the tractor and the towed vehicle by means of an Anderson battery connector. Both the cable and the connector shall be capable of withstanding a current of **not less than 60 A**. It shall also be fused to the appropriate amperage and constructed of an appropriate cable thickness, in this case **not less than 16 mm²**.



WARNING! To prevent fire, the dedicated power cable **must be** fused to the correct amperage.

15.3 Adjusting wheel end stop



WARNING! Always have the wheel end stop adjusted by an authorized Peecon dealer or Peeters Landbouwmachines B.V. Misalignment can seriously damage the steering system.

Adjusting the wheel end stop is important prevents the steering angle sensor from rotating to far. The end stop needs to be adjusted so that it contacts the rear tyres of the tractor before the steering angle sensor can achieve an angular rotation of 45 degrees. The steering angle sensor can be damaged when expose to higher angular rotations,. The end stop is shown in green, shown in Figure 15-2.

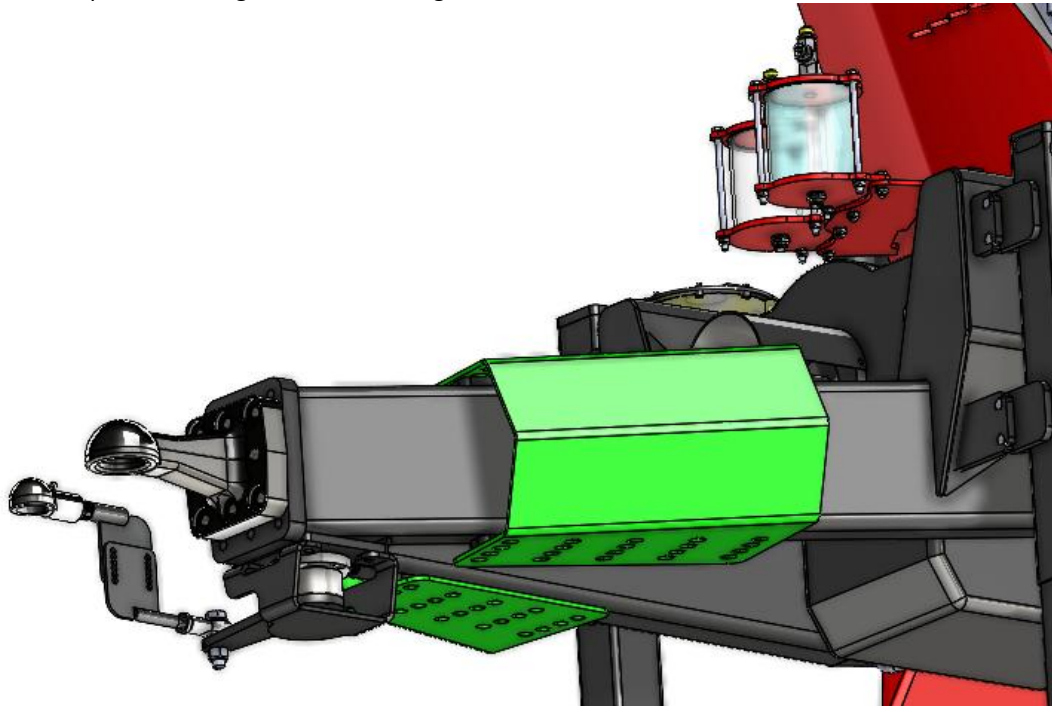
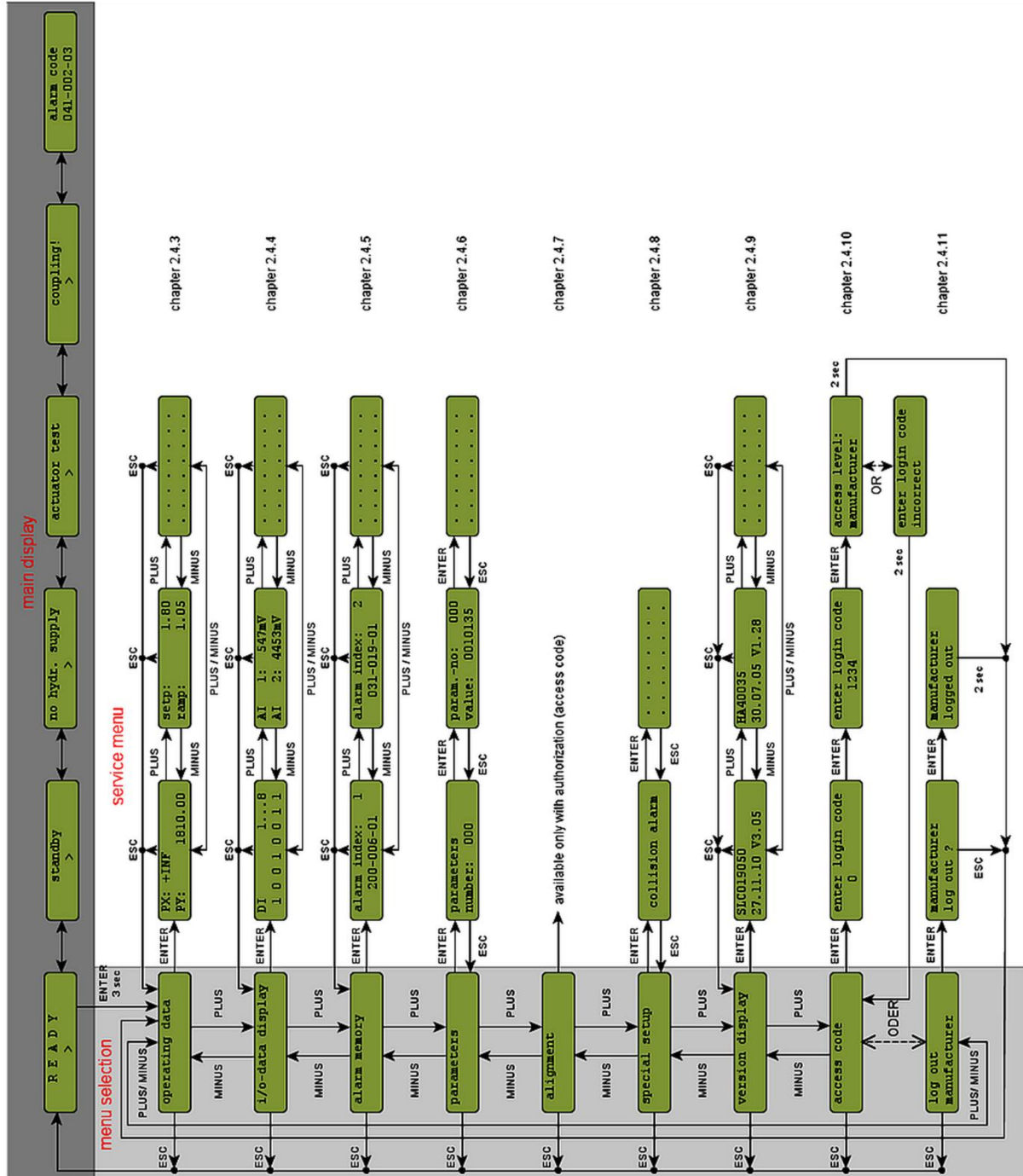


Figure 15-2 Final stop drawbar

15.4 Steering computer control

The control computer can be operated using the decision tree below. Study this decision tree carefully before working with the machine. The user and maintenance technician should be deemed fully proficient in the operation of the steering computer. Further explanation about the steering computer can be found in part 3 of the supplied manual of Mobil Elektronik.



16. Maintenance Mobil Elektronik steering system

16.1 Maintenance schedule Mobil Elektronik electronically controlled system

In order for your machine to function optimally and to guarantee a long service life, it is important that the maintenance is carried out in a timely and correct manner. Below is the maintenance schedule of the Mobil Elektronik electronic steering system. On the basis of this diagram it is easy to see when which activities need to be carried out and when which components need to be lubricated. The specific tasks will be explained below. These tasks are described in detail in part 1 of the supplied Mobil Elektronik manual.

| LUBRICATION POINTS AND MAINTENANCE WORK | BEFOR EVERY USE | DURING COUPLING | AFTER 40 HOURS OF OPERATION | AFTER EVERY 200 OPERATING HOURS OR 6 | AFTER EVERY 500 OPERATING HOURS OR |
|---|-----------------|-----------------|-----------------------------|--------------------------------------|------------------------------------|
| <ul style="list-style-type: none"> ○ LUBRICATE □ MAINTENANCE WORK | | | | | |
| LUBRICATE WITH EP 3 GREASE | | | | | |
| 1: STEERING ROD END | | | ○ | | |
| MAINTENANCE WORK | | | | | |
| 1: CHECK HYDRAULIC SYSTEM | | | | □ | |
| 2: CHECK WARNING SYSTEM | □ | | | | |
| 3: READ STEERING COMPUTER ERROR CODES | | | | | □ |
| 4: VISUAL CHECK STEERING ANGLE SENSOR ON THE AXLE | | | | □ | |
| 5: VISUAL CHECK STEERING ANGLE SENSOR ON THE DRAWBAR | | □ | | □ | |

Table 5 Maintenance schedule Mobil Elektronik components steering system

16.2 Lubricating steering rod end

The steering angle sensor is connected to the tractor by means of the steering rod. This steering rod has a coupling at both ends. In most cases, this is a articulated eye or rod end on the side of the steering angle sensor and a K50 drawbar eye on the side of the tractor.

The rod end can be maintenance-free. In this case, there will be no grease nipple on the eye and therefore it does not have to be lubricated. If a grease nipple can be found on the rod end, it must be lubricated at the same interval as the K50 draw eye. The K50 drawbar eye is always equipped with a lubricating nipple. Use it to lubricate the drawbar eye while it is attached to the tractor.

16.3 Check hydraulic system

Conduct a visual check of the hydraulic system of the machine. Check all lines, hoses, connectors, actuators, control valves and cylinders for damage, corrosion and visible oil residues that may be a possible indication of leaks. If any of these components show any of these symptoms, they should be replaced. In addition, all flexible hydraulic hoses must be replaced at least every 7 years.

16.4 Warning system control

For most Peecon vehicles with electronically steered axles, the warning system will be integrated into the control box of the machine, placed in the tractor. When starting up the system, pay attention to the integrated visual warning signal. An audio signal will also be provided. Both signals are used to indicate that the system is on. When these signals are not detected, the system is unable to communicate system errors with the user. Therefore, always check the operation of these warning signals before each use.

16.5 Read steering computer error codes in memory

The error memory of the steering computer must be read at least once a year. Check whether the system has generated error codes. These error codes may indicate problems with the steering system and should therefore be carefully checked. The saved error code can be found in the 'Alarm memory' menu. After reading, the error code memory must be emptied. In order to erase the error codes, the correct access code must first be entered in the steering computer. For information on operating the steering computer, see 15.4.

16.6 Visual check steering angle sensor on the axle

The steering angle sensor on the axle(s) is used by the steering computer to measure the actual steering angle achieved by the axle. The steering angle sensor is connected to the steering rod which connects both steering knuckles of the axle. Check the sensor for damage, corrosion and wear to the mechanical connection and replace if any of these defects are detected.

16.7 Visual check steering angle sensor on the drawbar

The steering angle sensor on the drawbar should be visually checked for damage and corrosion during coupling. The mechanical connection between the K50 drawbar eye and the steering angle sensor must also be checked for damage and deformation. Replace the damaged components if any of these defects are found.

17. Aligning the Mobil Elektronik steering system.

17.1 When is steering system alignment necessary?

Alignment of a steered towed vehicle is subject to periodic maintenance. Due to normal use, it is possible that a deviation in the steered axles will occur over time. The result is increased rolling resistance, resulting in higher tyre wear, fuel consumption and maintenance costs. In extreme cases, the towed vehicle may no longer be aligned with the tractor while driving in a straight line. When one of these symptoms is detected, it is time to align your vehicle's steering system.



WARNING! The alignment of the vehicle can have negative affect the driving and braking behaviour of the towed vehicle when it is no longer within specification. It is therefore advisable to check the steering system of the towed vehicle regularly and align it if necessary.

17.2 Preparations alignment procedure Mobil Elektronik steering system

To align the electronically controlled steering system, both the steering angle sensor on the drawbar and the axles themselves must be aligned. For this, it is important that the vehicle is placed on a flat surface. Before the start of alignment, the towed vehicle and the tractor need to be positioned in a straight line in order to adjust the steering bar length correctly. This can be achieved by driving straight ahead over a distance of approximately 30 meters.

If the vehicle is equipped with hydro-pneumatic suspension it is also important that the ride height of the towed vehicle is adjusted correctly. In the event of an incorrect ride height, the towed vehicle can still be misaligned. The ride height can be checked by measuring the length of the rod of the suspension cylinders. These must all be extended approximately 100 mm.

Restart the steering system by disconnecting the electrical supply to the steering system of the towed vehicle and reconnecting it after approximately 10 seconds. Also make sure that all necessary hydraulic connections are connected.

17.2.1 Adjusting the steering rod Mobil Elektronik

In order to align the steering angle sensor, it is important that the steering angle sensor arm is perpendicular to the direction of travel of the towed vehicle when moving straight ahead, as shown in Figure 17-1. If this is not the case, the length of the steering rod must be adjusted until this condition is met.



WARNING! To prevent damage to the steering angle sensor, the steering rod length should be checked each time the towed vehicle is coupled. This applies in particular to the coupling behind another/new tractor.

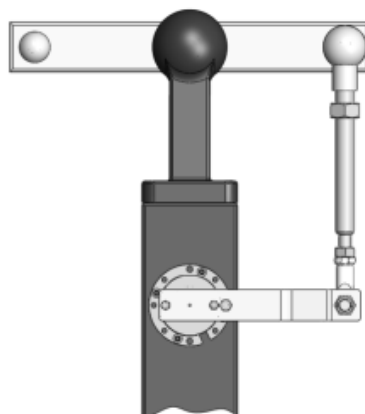


Figure 17-1 Steering rod length steering angle sensor

17.2.2 Alignment procedure Mobil Elektronik steering system

After the steering computer has had time to fully start up, the screen will display the text "READY", as shown in Figure 17-2. Wait to start the alignment procedure until this screen appears.



Figure 17-2 Start screen steering computer

In order to place the steering computer in the alignment position, the following procedure should be followed:

1. Press and hold the enter button for approximately 4 seconds.
2. Navigate to the menu to enter the access code, see 15.4.
3. The access code is 7101. The correct number can be entered by using the plus or minus buttons on the computer. By pressing the enter button once, the following number can be entered. When the correct code is entered, it can be activated by pressing the enter button twice in a row.
4. Then navigate to the 'Alignment' menu and click enter.
5. Select the alignment method "M1 calibration, axle by axle", see Figure 17-3.
6. The steering computer will now display the text "select axle for alignment: 0". Axle 0 indicates the steering angle sensor. If necessary, use the plus and minus button when another axle number is visible. Then press the enter button when the correct axle is selected.
7. The steering computer will now ask to place "Axle 0 to 0". This prompts you to place the steering angle sensor in the middle position. Check that the length of the steering rod is adjusted correctly and press the enter button.
8. The steering computer will now display the text "Left". This refers to the angle between towed vehicle and tractor when the tractor steers to the left as seen in Figure 17-4. Disconnect the steering rod from the tractor and turn the steering angle sensor by hand approximately 45 degrees to the left. Then press the enter button.
9. The steering computer will now display the text "Right". This is the angle between the towed vehicle and the tractor when the tractor steers to the right. Place the steering angle sensor manually at an angle of approximately 45 degrees to the right and press enter.
10. The steering computer will now display the text "back to center". Move the steering angle sensor to the mid position and press enter.
11. Aligning the steered axles is done in a similar way. For this purpose, the axles are numbered from 1 in ascending order. Axle 1 corresponds to the front axle of the towed vehicle. Non-steered axles do not need to be aligned, this only applies to the steered axles. The specific axle numbers depend on the vehicle configuration. The alignment process is the same for all steered axles.
12. The steering computer will now display the text "select axle for alignment: 0". Use the plus and minus buttons to select axis 1, if axis 1 is a steered axle, and press enter.
13. The computer will ask you to place the axle in the middle position, check if the axle is actually in this position and press enter. When the axle is not in the middle, the plus and minus buttons can be used to control the axle. With a correctly connected system, the minus button steers to the left and the plus button to the right.
14. Then the computer will ask to steer axle 1 to the left. Use the plus and minus buttons to steer the axle to the left. Move the axle as far to the left as possible, until the end stop is hit, and press enter.
15. After this, the computer will ask to steer axle 1 to the right. Steer the axle as far to the right as possible, using the plus and minus buttons, and then press enter.
16. Repeat the steps for axle 1 on all steered axles.
17. When all axles are aligned, the alignment menu can be exited by pressing the escape button twice.
18. Restart the system by operating the main power switch and test the steering control by manually rotating the steering angle sensor.

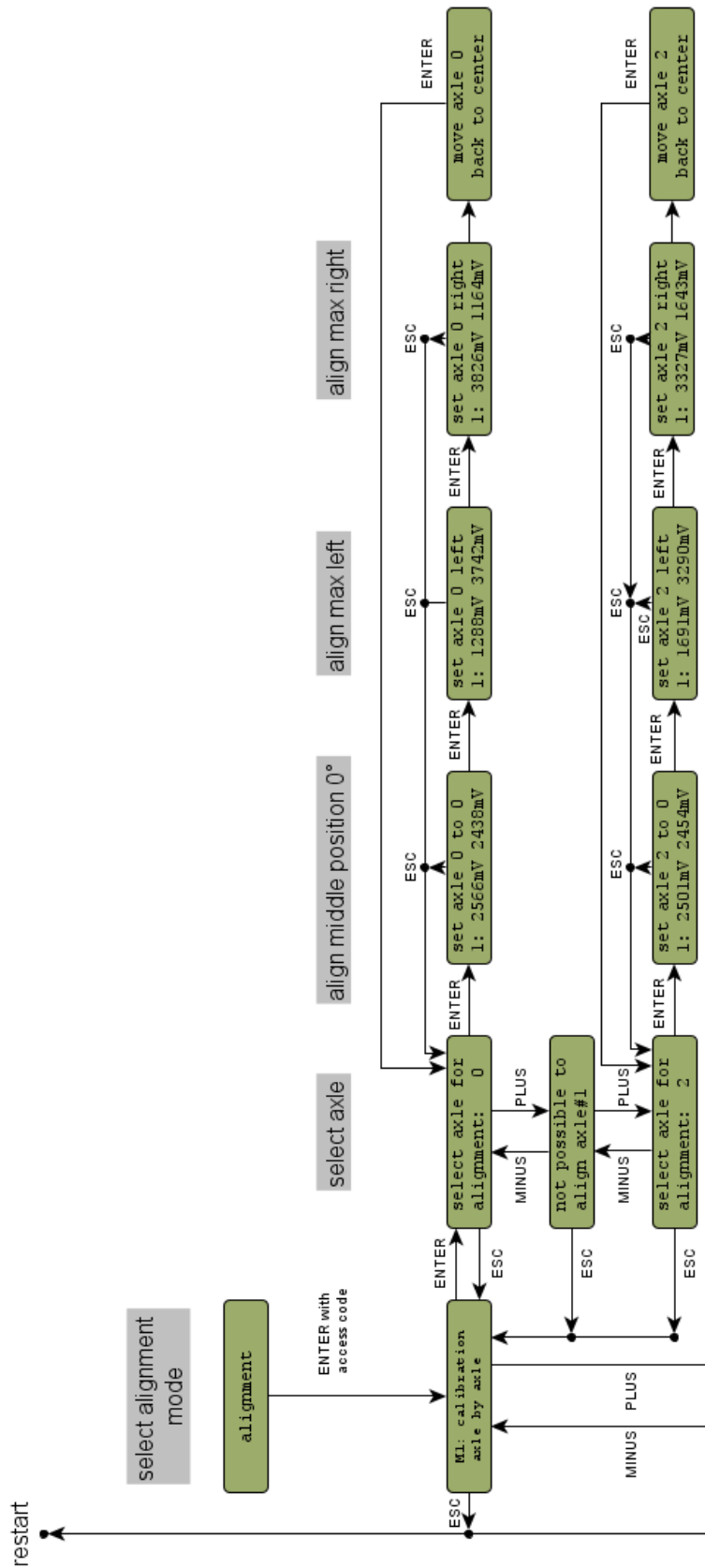


Figure 17-3 Alignment steps and screens control computer

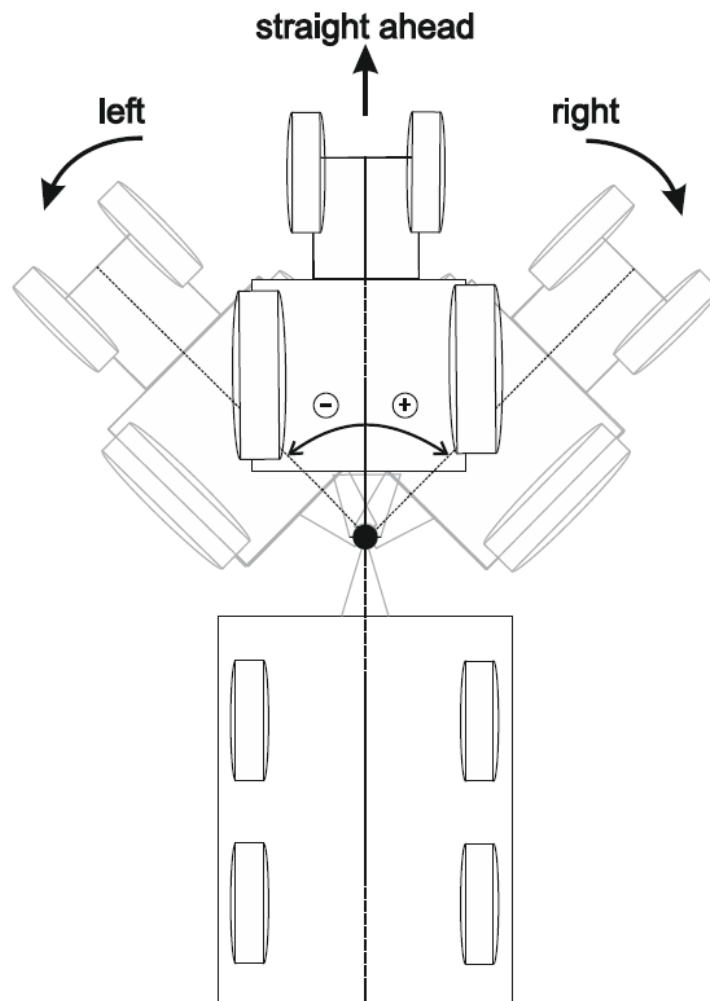


Figure 17-4 Directions of steering of the towed vehicle and tractor during alignment.

17.3 Bleeding Mobil Elektronik steering system

In normal use, there is no need to manually bleed the electronic steering system. The system will perform this automatically during use. However, it may be necessary to bleed the system after specific maintenance tasks have been carried out. To bleed the Mobil Elektronik steering system, follow these steps:

- Make sure that all hydraulic and electronic connectors are disconnected.
- Open the bleed valves on the steering cylinders on the steered axles.
- Put the steering angle sensor in the middle position.
- Connect all electronic and hydraulic couplings to the tractor, **except the Load-Sense line and the steering rod**. By leaving the Load-Sense decoupled, the pressures in the hydraulic system are limited, so that the bleeding can be carried out safely.
- Start the tractor and wait for the electronic steering system to fully power up (approximately 10 seconds after receiving power).
- After this, slowly begin to supply oil the electronic steering system. This can be done by manually rotating the steering angle sensor. Start with small angular movements and build it up slowly.
- When hydraulic oil starts to flow out of the bleeding valves, the valves can be closed.
- When all vents are closed, the system is fully bled. Check the operation of the steering system by manually turning the steering angle sensor.
- When the system responds properly to the steering angle sensor input, the steering rod and the Load-Sens line can be reconnected.

18. Malfunctions Mobil Elektronik steering system

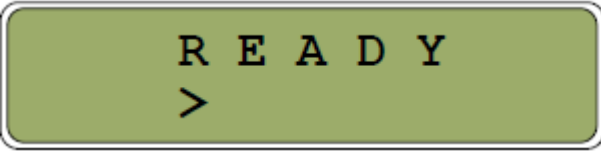
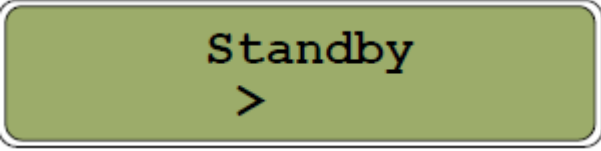
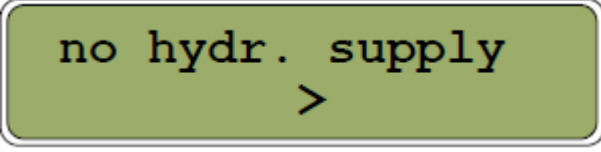
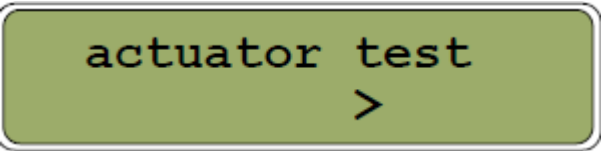
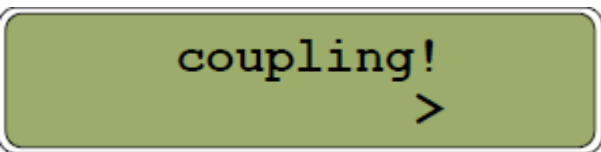
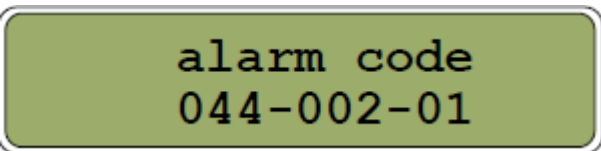
The troubleshooting table below shows the most common failures and problems with the Mobil Elektronik steering system. If your machine has a problem that does not appear in the table below or the problem cannot be solved by means of the mentioned solution, please contact your dealer or Peeters Landbouwmachines B.V.

18.1 General failures

| Malfunction | Cause | Solution |
|---|--|---|
| The steering system does not respond to steering angle changes of the steering angle sensor on the drawbar. | Hydraulic pressure hose is misconnected. | Check that the connected hoses are connected correctly. |
| | A problem has arisen in the electronic steering system. | Check the electronic steering system screen for error codes. |
| The steering system responds slowly to steering angle changes. | The return line is not (correctly) connected. | Check that the return line is connected correctly. |
| | The hydraulic system of the tractor does not provide sufficient flow. | The electronic steering system requires a minimum flow rate of 70 l/min on the pressure supply from the tractor. Disable other hydraulic functions or install a larger hydraulic pump on the tractor. Check the fluid level of the hydraulic reservoir on the tractor. If there is insufficient fluid in the tank, the tractor cannot reach the required flow rate (at least 70 l/min) from the pressure line. |
| The steering system works at standstill but unexplained and unreproducible error messages occur while driving. | The system receives an unexpected value from one or more sensors on the towed vehicle. | Proper and timely execution of the maintenance schedule can prevent unexplained and unreproducible error codes. For example, an incorrectly adjusted wheel bearing can cause problems for the wheel speed sensors. Under heavy use, the maintenance intervals may not be met, so maintenance must be carried out earlier. Discuss this with your dealer or with Peeters Agricultural Machinery. |

18.2 System status on screen electronic steering system

The screen of the steering computer has a diagnostic function for the electronic steering system. The screen can indicate the following system statuses.

| System status | Meaning |
|--|---|
|  <p>READY ></p> | <p>The system is on and ready to steer the axles. This is the screen that is visible during normal use. After turning on the system, it will take about 10 seconds for this screen to appear.</p> |
|  <p>Standby ></p> | <p>The system is switched on, but the steering function of the axles is disabled. This screen is displayed when the towed vehicle is stationary and no axle steering is needed.</p> |
|  <p>no hydr. supply ></p> | <p>This screen is displayed when the steering computer detects no or insufficient hydraulic supply. This message is only visible when the towed vehicle is stationary. When it starts driving again, the screen will go back to 'READY'</p> |
|  <p>actuator test ></p> | <p>This screen indicates that the steering computer is testing the hydraulic actuators. This test can only be carried out when the vehicle is stationary and receives a sufficient supply of hydraulic fluid. Under normal operation, the system will always perform an actuator test during startup.</p> |
|  <p>coupling! ></p> | <p>The steering computer indicates with this screen that the steering angle sensor is not connected. As a result, the system will function only to a limited extent.</p> |
|  <p>alarm code 044-002-01</p> | <p>The system has generated an alarm code. These are codes that can help find and resolve complex system failures. A complete list of fault codes can be found in part 4 of the supplied manual of Mobil Elektronik.</p> |