General information on changing the axle distance

IMPORTANT!

Changing the axle distance of a truck chassis affects the properties of that chassis. It is therefore important to follow Scania’s recommendations.

- A Scania workshop must always be contacted before starting any work which changes the axle distance. They can provide you with information on standard dimensions for axle distance and propeller shafts.
- We advise selecting one of Scania’s standard axle distances for the new axle position. This makes it possible to fit the chassis with Scania original propeller shafts.
- Always use Scania parts for critical tasks. This means that the dimensions will always be optimum.
- Changing the axle distance requires changing the SOPS file.

Methods

Axle distance can be changed in one of the following two ways:

1. Moving the rear axle or the bogie attachment on the chassis frame (recommended)
2. Cutting and joining the chassis frame
   - This method involves cutting the chassis frame in front of the rear axle and welding it together after changing the axle distance.
   - The rear axle or bogie with spring brackets and crossmembers are not removed from the chassis frame; they are moved as a complete package.

Further information about changing the SOPS file is contained in the document “Re-programming control units” under General information.

The methods for changing the axle distance are described in more detail later in the document.
Changing the axle distance

- Scania recommends that cutting and joining of the chassis frame be carried out by an authorised Scania workshop.
**Rules and conditions**

**Moving the rear axle or bogie**

In order to change the axle distance, the rear axle must be moved, regardless of the method used. First try to move the rear axle or bogie attachment on the chassis frame in order to change the axle distance.

**Cutting the chassis frame**

Changing the axle distance by cutting the chassis frame is not permitted for the following vehicle types:

- Tractors
- Tipper trucks without a subframe

**Extending the axle distance**

The axle distance must not exceed the maximum permitted standard distance with which that vehicle type is available from the factory.

*Exceptions*: For vehicles with a fixed bodywork and an evenly distributed load, the axle distance can be extended beyond the maximum permitted standard axle distance with which that vehicle type is available from the factory. However, it is necessary to ensure that the bodywork is designed so that the necessary reinforcement of the chassis frame can be achieved. Otherwise there is a risk of frame oscillations.

**Shortening the axle distance**

The axle distance must not be less than the minimum standard distance for that vehicle type.
Changing the axle distance

Location of crossmembers

- Position crossmembers in their standard positions if the new axle distance is a standard axle distance. Contact a Scania dealer for information on standard axle distance.
- If the new axle distance is not a standard axle distance, position the crossmembers in positions that are suitable for the length of the propeller shafts.

Length and location of the propeller shafts

If the axle distance is changed, the propeller shaft and any intermediate propeller shafts must be modified or renewed.

- We advise selecting one of Scania’s standard axle distances for the new axle position. This makes it possible to fit the chassis with Scania original propeller shafts.
- Existing propeller shafts can also be extended or shortened.

Note:

- Special equipment for welding, straightening and balancing propeller shafts must be used when changing the length of propeller shafts. Always contact a Scania workshop to discuss this type of modification
- All screws which are removed from the propeller shaft must be replaced with new ones. It is important to use the correct type of screws. The screws must be tightened to the correct torque. Do not use a nut runner. Always contact a Scania dealer for the correct type of screws and other information.

More information can be found in the document “Removing and fitting the cross-member”.

A propeller shaft or intermediate propeller shaft must not be longer than 2,000 mm.
Changing the axle distance

Universal joint angles

After extending or shortening the axle distance, it is sometimes necessary to change one or more universal joint angles in order to reduce the irregularity between them.

Change the universal joint angles using one of the following methods:

- Modifying or moving support bearings.
- Modifying the rear axle inclination.
- Reducing the tag axle lifting height, (applies to 6x2 vehicles).

Note:

Long propeller shafts and incorrect universal joint angles cause vibrations in the chassis and powertrain.

Modifying the rear axle inclination

For vehicles with leaf spring suspension, the inclination of the rear axle can be changed using wedges, which are positioned between the rear axle spring seat and the spring.

Note:

Do not change the inclination of the rear axle by more than 3°.

The following wedges can be ordered from Scania:

<table>
<thead>
<tr>
<th>Part number</th>
<th>Size (mm)</th>
<th>Inclination</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 355</td>
<td>220x90</td>
<td>0.5°</td>
</tr>
<tr>
<td>250 539</td>
<td>220x100</td>
<td>1.5°</td>
</tr>
<tr>
<td>277 975</td>
<td>220x100</td>
<td>2.08°</td>
</tr>
<tr>
<td>246 263</td>
<td>220x100</td>
<td>5.0°</td>
</tr>
</tbody>
</table>

More information can be found in the document “General information about power take-offs” under Power take-offs.
### Changing the axle distance

#### Rules and conditions

<table>
<thead>
<tr>
<th>Part number</th>
<th>Size (mm)</th>
<th>Inclination</th>
</tr>
</thead>
<tbody>
<tr>
<td>277 976</td>
<td>220x100</td>
<td>5.5°</td>
</tr>
</tbody>
</table>
Reducing the tag axle lifting height on 6x2Z trucks

Note:
A tag axle lift with a reduced lifting height should always be used on 6x2Z trucks where the axle distance has been reduced to less than 3,300 mm.

On 6x2Z trucks, the chassis frame inclination increases significantly when the tag axle is lifted. The tag axle lift also causes irregularity between the propeller shaft angles. A very marked irregularity occurs in trucks with a short axle distance.

6x2Z trucks ordered with an axle distance of 3,100 mm or less are always fitted with a tag axle lift with reduced lifting height.

Note:
The tag axle lifting height can also be reduced on trucks with a longer axle distance, but there is a high risk of the tag axle wheels being in contact with the ground when they are lifted and the vehicle is being driven on an uneven surface.

Procedure

1. Replace the hydraulic cylinder with one with a 32 mm shorter piston stroke (part number 1378315).
2. Fit separator insert 1377710 (1) between the rubber pad (2) and the bracket (3), which stops the movement of the balance arm.

Pneumatic system

All work on the pneumatic system should be carried out according to the instructions in the document “Pneumatic system” under Chassis modifications.
Welding

**IMPORTANT!**

All welding must be carried out to a high degree of precision by trained personnel. Avoid welding in the chassis frame as far as possible as the risk of fracturing increases in the area around weld seams. It is particularly important to avoid welding in areas on the frame with stringent strength and fatigue strength requirements.

- Welding on the chassis frame is generally permitted in the area 1,000 mm behind the bogie centre on trucks with an evenly distributed load.

**Exceptions:**
- Vehicles with large spot loads behind the joint, e.g. bulk tankers, concrete mixer trucks and vehicles with rear-mounted equipment such as a crane.
- Vehicles with a drawbeam located 1,000 mm or more behind another weld joint
- Joining and welding in the area between the front and rear axles on tractors is not permitted.

Further information about welding is available from the document “Welding” under General information.
Drilling holes

**IMPORTANT!**

Never drill in the flanges of the frame side members.

**Exceptions:** 100 millimetres from the rear of the frame side members.

Flanges absorb the major stresses in the frame side members. Therefore, there is an extremely high risk of fracture formation around holes drilled in or near the flanges.

More information can be found in the document “Hole drilling” under General information.
Moving the rear axle or bogie

The rear axle or bogie can be moved on vehicles with a single frame and on vehicles with a double frame.

Extending the rear overhang

The new support point for the trailing rear axle must be left in front of the future outer frame joint if the rear overhang is to be extended.

More information on how to extend the rear overhang is found in the document “Extending the rear overhang”.
Changing the axle distance

**Extension of inner frame**

If the rear axle or bogie is moved backwards on trucks with a double frame, the inner frame must be extended. The extension beam should be at least as long as the extension of the axle distance.

Seal the gap between the outer frame and the inner frame using sealant; otherwise there is a risk of moisture ingress. Primer is recommended where possible.

Extended inner frame can be ordered as special order from factory. Contact a Scania dealer for more information.

Older vehicles may have plug welds. If they do, the rivets should be positioned 50 mm longitudinally from the plug weld.

Chamfer the weld joints as illustrated.

A = Metal arc welding

B = MIG welding

1. Existing inner beam.
2. New inner beam.
3. Existing rivets.
4. New rivets or M14 tight-fit screws.
5. Outer beam.

A. 200 mm
B. 51-59 mm
C. 70-78 mm
**Work description**

1. Remove the propeller shafts and compressed air lines to the rear axle or bogie that is to be moved; also remove other components that could impede work.

2. Support the rear end of the chassis on an axle stand.

3. Take the check dimension (M) as follows:
   a) Position a ruler across the frame using a set square at the front of the chassis frame where the frame side members are parallel.
   b) Punch the two front check points, one on each frame side member, next to the ruler. Position the punch marks in the chassis frame flanges as close to the frame member webs as possible. This has a minimal effect on the strength of the frame.
   c) Punch the two rear check points in the same way so as to take the check dimension (M).

4. Remove the spring brackets and their crossmembers.

5. Drill new holes for the spring brackets and crossmembers. If no drilling fixtures are available, the spring brackets and crossmembers can be used as templates.

6. Fit the components using cold riveting or screw joints. In the latter case, ream the screw holes together and use tight-fit screws.

7. Weld and fill the holes if the distance to the new holes is less than that described in the document “Hole drilling”.

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*Check dimensions before moving.*
Changing the axle distance

Cutting and joining

Note:
All joining on the chassis frame weakens it.

Cutting and joining single frames

IMPORTANT!
Responsibility for the correct joining of the chassis frame is always that of the person who has carried out this work.

Note:
Cutting the chassis frame may only be carried out on trucks with an F950 frame.
The joining of double frames should only be carried out in exceptional circumstances.

This method involves cutting the chassis frame in front of the rear axle and welding it together after changing the axle distance.
The rear axle or bogie with spring brackets and crossmembers are not removed from the chassis frame; they are moved as a complete package.

The position of the frame joints

Note:
The frame joint must not be positioned close to sections under a high load from the bodywork.

More information about joining double frames can be found under the heading “Cutting and joining double frames” later on in the document.
Cut the chassis frame so that the joints have a margin to the following components:

- Spring brackets
- Tag axle attachment
- Crossmembers
- Chassis components (tanks, spare wheel carriers, tool boxes, etc.)
- Position the front joints (in the case of extension) taking into account factors such as the location of the crossmembers. It is important that there is enough room for the reinforcement plates and that they can be positioned symmetrically on the inside of the frame.

**Extension beams and reinforcement plates**

Scania’s parts range comprise e.g. extension beams and reinforcement plates in a variety of different designs.

Components manufactured in-house must be of the same material as the frame side members or of a material with corresponding properties and quality.

*Further information about the positioning of joints is available under the heading “Cutting and joining double frames” later in the document.*

*Further information on the properties of the material is available in the “Chassis frames” document under Frames and subframes.*
Changing the axle distance

Work description

1. Remove the propeller shafts and compressed air lines to the rear axle or bogie that is to be moved; also remove other components that could impede work.

2. Support the entire chassis on axle stands in the following positions:
   - At the front behind the bumper
   - In front of and behind the cutting point
   - The rear end of the chassis

3. Adjust the axle stands and use a spirit level to check that the chassis is horizontal.

4. Mark where to cut the frame side members.

5. Take the check dimension (M) as follows:
   a) Position a ruler across the frame using a set square at the front of the chassis frame where the frame side members are parallel.
   b) Punch the two front check points, one on each frame side member, next to the ruler. Position the punch marks in the chassis frame flanges as close to the frame member webs as possible. This has a minimal effect on the strength of the frame.
   c) Punch the two rear check points in the same way so as to take the check dimension (M). Position the check points so that they do not disappear when shortening the axle distance. A suitable position is behind the rear axle or bogie.

6. Cut the frame side members using a cutting disc. A piece of flat steel, bent to the frame side member profile, is recommended as a guide.

7. Chamfer the frame side member weld joints as illustrated.

Continued on the next page.
8. Position the rear frame part so that the new check dimension (MK or ML) corresponds to the changed axle distance.

9. Support the frame parts on axle stands and use a spirit level to check that they are level.

10. When extending the axle distance:
   a) Chamfer the weld joints on the extension beams.
   b) Position the extension beams between the frame side members.

11. Assemble the frame parts.

12. Check that the dimensions MK or ML match and that the frame parts are level.

13. Weld the frame parts together and grind smooth the weld seams.

14. Paint the surfaces.

Continued on the next page.

More information on painting is available in the documents under Painting.
15. Reinforce the frame joints using Scania’s 8 mm thick inner beam or fabricate internal reinforcement plates as follows:
   - Plate thickness must be at least 6 mm.
   - It is best to fabricate the reinforcement plates in two sections secured in the upper and lower flanges of the frame side member. Ensure that there is an approximately 5 mm longitudinal gap between them.
   - Plug-weld the reinforcement plates to the beam web and weld together the longitudinal gap.
   - Seal the gap between the frame side member and the reinforcement using sealant; otherwise there is a risk of moisture ingress. Primer is recommended where possible.

**IMPORTANT!**

Internal welding is not permitted against the beam flanges.
Changing the axle distance

Cutting and joining double frames

**Note:**
The joining of double frames should only be carried out in exceptional circumstances.

**IMPORTANT!**
Extreme care must be taken when cutting inner or outer frames so that the adjacent frame is not damaged.

Join the double frame with an offset of at least 250 mm between the joints of the inner frame and outer frame. In this case no additional reinforcement plate is required.

Seal the gap between the outer frame and the inner frame using sealant; otherwise there is a risk of moisture ingress. Primer is recommended where possible.

**Exceptions:** In the case of a frame shortening which results in an axle distance of 3,100-3,400 mm, the offset must be reduced to 100 mm.

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*Position of the joints after shortening (one joint for the cut inner frame and two for the outer frame)*

*Position of the joints after extension (two joints for the new outer frame section and two for the inner frame)*