Modification and conversion conditions

**IMPORTANT!**

- The brake circuits must not be used for connecting additional compressed air tanks.
- Conversion of the brake system which requires the control unit to be reprogrammed should only be performed in a Scania workshop.

Always contact a Scania dealer before starting a modification to the vehicle's pneumatic system for answers to the following questions:

- Is the conversion permitted?
- Does the SOPS file need to be modified (Scania On-board Product Specification)?
- Do the parameter values need to be updated using SDP3 (Scania Diagnos & Programmer 3)?

**WARNING!**

Empty the pneumatic system before starting work as the air pressure is very high and can cause personal injury.

Further information about the SOPS file is contained in the document Reprogramming control units.
High air consumption

Causes and suggested actions

In certain circumstances and driving conditions, it may be the case that the air supply is not sufficient. If this occurs, the vehicle will indicate that the air consumption is too high. Examples of such cases are:

- The trailer air consumption is high
- The accessory circuit air consumption is high
- The air suspension is being adjusted frequently.

There are several ways to affect the air supply. The selection of additional air supply is controlled by how the vehicle is used.

<table>
<thead>
<tr>
<th>Event/air requirement</th>
<th>Action</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Refer to the section</th>
</tr>
</thead>
<tbody>
<tr>
<td>High air requirement for the accessory circuit and possibly also for the air suspension</td>
<td>Common compressed air circuit for additional equipment and air suspension, or compressed air circuit for additional equipment only</td>
<td>Simple conversion</td>
<td>Reduces the margin for the air suspension</td>
<td>Additional compressed air for additional equipment</td>
</tr>
<tr>
<td>Frequent air suspension adjustment, i.e. for raising and lowering</td>
<td>Additional compressed air tanks retrofitted or factory fitted to increase the capacity in the air suspension</td>
<td>Increases the margin when using the air suspension</td>
<td>Requires time for charging between situations when the air suspension is adjusted</td>
<td>Additional compressed air tanks for air suspension</td>
</tr>
<tr>
<td>High air requirement in all circuits, including the brake circuits, e.g. full trailer with many axles</td>
<td>Additional compressed air tank for all circuits to increase the total air capacity in the system</td>
<td>Increased consumption margin in all circuits</td>
<td>Time-consuming to charge. Long charging time; requires new Scania On-board Product Specification.</td>
<td>Additional compressed air tank for all circuits</td>
</tr>
<tr>
<td>For continuously increased air requirement</td>
<td>Higher capacity APS unit if operation continuously requires a lot of air</td>
<td>Shortens charging time through faster regeneration. Can be combined with the above alternatives</td>
<td>Requires major conversion</td>
<td>Higher capacity APS unit</td>
</tr>
</tbody>
</table>
Modifying the pneumatic system

Note:
Higher capacity APS unit may only be fitted by a Scania workshop. Contact a Scania workshop for more information.

More information on factory-fitted options for additional compressed air supply can be found in the document Additional compressed air.
Additional compressed air for additional equipment

The following connections can satisfy temporary requirements for additional compressed air. For the connection examples “Common compressed air circuit for additional equipment and air suspension” and “Compressed air circuit for additional equipment only”, the connection should be made downstream of the overflow valve (F) so that the compressed air cannot flow back to the APS unit.

It is important to note that connection of the compressed air circuit downstream of the overflow valve (F) – see the diagram – does not delay the time for vehicle start when charging an empty system.

<table>
<thead>
<tr>
<th>Component</th>
<th>Designation</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Pressure limiting valve</td>
<td>1 914 109</td>
</tr>
<tr>
<td>F</td>
<td>Overflow valve</td>
<td>1 920 145</td>
</tr>
<tr>
<td>G</td>
<td>Check valve (Check that the valve is correctly positioned and is facing the right direction)</td>
<td>1 912 297</td>
</tr>
<tr>
<td>H</td>
<td>Additional compressed air tank</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard compressed air tank, 30 litres</td>
<td>1 357 950</td>
</tr>
<tr>
<td></td>
<td>Aluminium compressed air tank, 30 litres</td>
<td>1 549 617</td>
</tr>
</tbody>
</table>

A general description and general pneumatic diagram can be found in the document General information about the pneumatic system.
Modifying the pneumatic system

Common compressed air circuit for additional equipment and air suspension

The circuits for additional equipment and air suspension share the compressed air tank. Compressed air is saved by the system so that it can be used in the compressed air circuit for accessory systems or by the air suspension. The pressure level in the air suspension is 12.3 bar, but is limited to 8.5 bar by the pressure limiting valve (E).

In this way, capacity is increased in both the air suspension circuit and the accessory circuit for a limited period. This type of connection is suitable when the components consuming compressed air are used frequently during short periods of time, while the air suspension system is frequently adjusting its height and there is time for the systems to be filled.

See the connection examples. Red, bold lines indicate modified parts of the system.
Compressed air circuit for additional equipment only

This type of connection is suitable when the components consuming compressed air are used frequently during short periods of time and there is time for the system to be filled.

The pressure level in the air suspension is 12.3 bar, but is limited to 8.5 bar by the pressure limiting valve (E). In this way, the capacity of the accessory circuit is increased.

This connection provides the accessory circuit with a greater capacity than the previous connection examples.

See the connection example. Red, bold lines indicate modified parts of the system.
**Additional compressed air tanks for air suspension**

In order for a vehicle which consumes a lot of air in the air suspension circuit to function stably, additional compressed air tanks are sometimes required. Additional compressed air tanks can be ordered directly from the factory or retrofitted.

No more than six 30-litre compressed air tanks should be used.

See the connection example. Red, bold lines indicate modified parts of the system.

It is important to note that connection of the compressed air circuit downstream of the overflow valve (F) – see the diagram – does not delay the time for vehicle start when charging an empty system.

*Connection of additional compressed air tanks (H) for air suspension.*
Additional compressed air tank for all circuits

The volume of air to the brakes, accessories, suspension and trailer brakes can be increased by connecting additional compressed air tanks between outlet 25 on the APS unit and an overflow valve (F), if fitted.

The connection example requires the number of compressed air tanks to be modified using SDP3 so that the air can flow back to the APS unit. Up to six 30-litre compressed air tanks can be used, but the number which can be used on a particular vehicle depends on the wheel configuration and the part number of the APS unit. The permitted number of compressed air tanks is indicated in SDP3.

Make sure that the new compressed air tanks can be easily drained from the outside of the frame.

**IMPORTANT!**

When the modification has been completed, the total number of additional compressed air tanks located between the APS unit and the overflow valve must be indicated using SDP3.

Without configuration, there is a risk of moisture being stored in the compressed air tanks, resulting in freezing damage in the brake system.

See the connection example. Red, bold lines indicate modified parts of the system.
Higher capacity APS unit

An APS unit with a compressed air tank for regeneration speeds up air dehumidification and helps the system recover more rapidly after periods of high air consumption.

A vehicle that does not have an APS unit with a compressed air tank for regeneration can be upgraded in various ways depending on when it was manufactured.

IMPORTANT!
Renewing the complete APS unit and upgrading with an intermediate piece may only be performed in a Scania workshop.
Upon APS unit renewal, the Scania workshop updates the SOPS file from Scania.

For more information on the higher capacity APS unit, contact a Scania dealer.
Modifying the pneumatic system

Parts for the conversion

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 357 950</td>
</tr>
<tr>
<td>Standard compressed air tank, 30 litres</td>
<td></td>
</tr>
<tr>
<td>Aluminium compressed air tank, 30 litres</td>
<td>1 549 617</td>
</tr>
<tr>
<td>2</td>
<td>1 373 483</td>
</tr>
<tr>
<td>Rubber separator insert</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1 391 742</td>
</tr>
<tr>
<td>Band clamp</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 745 877</td>
</tr>
<tr>
<td>Bracket</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1 785 354</td>
</tr>
<tr>
<td>Band clamp</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1 847 740</td>
</tr>
<tr>
<td>Bracket</td>
<td></td>
</tr>
</tbody>
</table>

The parts can be purchased from a Scania dealer.
Modifying the pneumatic system

Supplemented with an intermediate piece

To upgrade an APS unit on the following vehicles, simply supplement with an intermediate piece and a compressed air tank and then update the SOPS file.

Vehicle production period

<table>
<thead>
<tr>
<th>Production site</th>
<th>Chassis serial number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08-23</td>
<td></td>
</tr>
<tr>
<td>Södertälje</td>
<td>2 029 368 -</td>
</tr>
<tr>
<td>Zwolle</td>
<td>5 182 927 -</td>
</tr>
<tr>
<td>Angers</td>
<td>9 123 592 -</td>
</tr>
<tr>
<td>São Bernardo do Campo</td>
<td>3 613 456 -</td>
</tr>
</tbody>
</table>

Renewing the APS unit

On the following vehicles the complete APS unit must be renewed to obtain a higher capacity.

Vehicle production period

<table>
<thead>
<tr>
<th>Production site</th>
<th>Chassis serial number</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 2007-08-22</td>
<td></td>
</tr>
<tr>
<td>Södertälje</td>
<td>- 2 029 367</td>
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<tr>
<td>Zwolle</td>
<td>- 5 182 926</td>
</tr>
<tr>
<td>Angers</td>
<td>- 9 123 591</td>
</tr>
<tr>
<td>São Bernardo do Campo</td>
<td>- 3 613 455</td>
</tr>
</tbody>
</table>
Vehicles with central tyre inflation system

Only the driving axle can be connected for central tyre inflation using the vehicle standard APS unit.

If central tyre inflation should apply to all axles, then a separate system with its own air dryer and a separate compressor must be added.
Modifying the brake system

**IMPORTANT!**

The brake system is more sensitive than the other components of the pneumatic system. Therefore, special instructions must be observed if any modification is made.

In simple terms, the brake system comprises a supply part and a control part.

- The supply part runs from the air supply (APS unit) up to the pipe downstream of the compressed air tank.
- The control part runs from the valves, ABS, EBS and on to the wheels.

Modification of brake pipes must only be carried out as specified in the instructions later in this document.

Modification of compressed air pipes for the additional compressed air tanks must only be carried out in the supply part following the instructions below.

**Note:**

The brake system is subject to a number of different legal requirements, which limit and in some cases prevent some types of modifications.

Modification of the brake system, including modification of brake pipe length, means that the vehicle must undergo an additional inspection in certain countries.

**Brake pipes**

When renewing brake pipes, the diameter of the new pipe must not be less than the diameter of the existing pipe (normally 12 mm).
Modifying the pneumatic system

Control part of the brake system

**WARNING!**

The control part of the brake system, between the valve (5) and brake chamber (6), must not be modified since this would extend the brake reaction time and create imbalance in the braking effect.

**Unions**

Shortening is always possible in accordance with recommendations.

Joining is only permitted using composite unions approved by Scania.

The following composite unions must be used when joining pipes:

- For 12 mm pipes: 2 058 774 (1 piece) + 2 058 383 (2 pieces)
- For 8 mm pipes: 2 058 774 (1 piece) + 2 058 382 (2 pieces)
- For 6 mm pipes: 2 058 774 (1 piece) + 2 058 381 (2 pieces)

Do not renew existing unions with new unions with a greater angle. A straight union must be renewed with a straight union and it must not be replaced by an elbow union. A 45 degree elbow union must not be replaced by a 90 degree elbow union etc.

However, it is beneficial to replace an elbow union with a straight union or with an elbow union which has a smaller angle since this improves the air flow in the system.
Supply part of the brake system

Modifying pipe length and pipe diameter
The brake pipes between the compressed air tank (4) and the valve (5) for compressed air tank 1 and 2 can be extended to a maximum length of 6,000 mm between the tank and brake valve. An extension affects reaction time and should be avoided if possible.

The brake pipes for parking brake P are more sensitive and must not exceed 500 mm in order to maintain the reaction time for the trailer. On vehicles without trailer connections, the maximum length is 6,000 mm. If extending the brake pipes, always ensure that the pipes are fastened securely.

The supply part of the brake system is less sensitive than the control part and may therefore be modified to a greater extent according to the following conditions:

- Brake pipe extension is preferably done in upstream of the compressed air tank, but should generally be avoided.
- The addition of unions is permitted in the supply part. Do not increase the angle of the unions. See the instructions for the control part of the compressed air system as described above.
- Brake pipes may be joined provided that Scania-approved unions are used; see the previous page.
- When renewing brake pipes, the diameter of the new pipe must not be less than the diameter of the existing pipe (normally 12 mm).

1. Supply part of the brake system
2. Control part of the brake system
3. Air suspension/accessory circuit (not brake-related)
4. Compressed air tank
5. Any valves, ABS/EBS
Modifying the pneumatic system

Work descriptions for couplings

The compressed air pipes may have connector unions made of brass or composite material.

Different methods are required for connecting and removing compressed air pipes depending on whether the connector unions are made of brass or composite material.

It is important that the compressed air pipes are a high quality. The compressed air pipes and compressed air valves must be purchased from a Scania dealer.

IMPORTANT!

The compressed air pipes of the brake circuits and trailer brake circuits may only be joined using composite unions which are approved by Scania.

Special tool for composite unions: dismantling tool 589 890. Other tools: split ring pliers or similar, spanner.

Preparations

Check the following before starting work:

• The pneumatic system is depressurised.
• The dismantling tool is intact and clean.
• The plastic pipe and quick release coupling are intact and clean.
• The cutting surface of the plastic pipe is correct.
Modifying the pneumatic system

Composite unions

Note:
Scania recommends re-use of the quick release coupling no more than 5 times. The quick release coupling should then be renewed. In the event of uncertainty, renew the union.

Removing the plastic pipe
For connection unions of which are quick release couplings made of composite material, the following renewal method should be used.

1. Press the plastic pipe down to the bottom of the quick release coupling to release the thrust ring from its locked position.
2. Fit the dismantling tool around the plastic pipe.
3. Clamp the plastic pipe and press the dismantling tool down into the quick release coupling. Maintain the tool's pressure against the quick release coupling and remove the plastic pipe.

Fitting the plastic pipe
1. Press and turn the plastic pipe into place in the quick release coupling. A small click sound indicates that the plastic pipe is correctly fitted.
Modifying the pneumatic system

Removing the branch coupling
It is best to use a split ring pliers with small tips.

Removing the threaded coupling
Use a spanner.
Brass unions

Brass unions have an O-ring seal of the insert connection type.

The following applies to brass unions:

- If a compressed air pipe is to be disconnected from a component, the whole coupling must be unscrewed, because the pipe cannot be pulled off the union.
- When the pipe union is renewed the old one must be scrapped.