Repair manual GRAMMER seat suspension MSG95G and GL

GRAMMER

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Foreword

Notes on these instructions

This repair manual includes information and instructions on how to perform repair work on the seat suspension MSG95G of **GRAMMER** seats.

The repair of the upper seat part is described in the respective repair manual for the upper seat part S741 EAC to which a reference is made, if required.
Example:
Remove the cable of the seat occupancy detection system at the upper seat part (see repair manual for upper seat part).

The seat suspension MSG95AL and GL with handle at the front forms the basis for illustrations in this repair manual. In the case of technical deviations in work procedures (due to different seat suspension designs), refer to the current text or individual chapters of the manual.

Each chapter starts with a list of all preparatory work to be completed before starting repair. These preparations are described in separate chapters and shall be carried out without the preparatory steps described there.

For spare part orders, please use the numbers stated in the latest issue of the relevant spare parts catalogue.

The description of the work procedures refers to the removed seat suspension and the dismounted upper part of seat.
Depending on the individual installation situation, some work may also be performed on the installed seat suspension and/or with upper seat part. For this reason, check the environment of the installed seat suspension for this possibility before starting work. The safety instructions of the specific vehicle manufacturer and those stated in chapter 1 of this repair manual must be strictly observed.

This repair manual also includes some information on delivery options, if these require further explanation. Since the scope of delivery depends on the specific customer order, the actual seat suspension design may deviate from the descriptions and illustrations in this manual.

The illustrated repair steps refer to the seat suspension for left-hand drive. Different work steps are to be performed laterally reversed when repairing vehicle models with right-hand drive.

If not stated otherwise, the directional indications "front, back" and "right, left" refer to the installed seat suspension regarded in the driving direction of the vehicle.

The document layout is suitable for later use of this repair manual via CD-ROM / INTERNET / INTRANET. A navigation line was entered below the heading for this. This navigation line includes the Chapter titles and it allows the user to jump directly to these Chapters after the corresponding hyperlinks have been set.

Basic information on the seat suspension

The seat suspension is provided with a long-lasting lubrication (approx. 10 years). The lubricating points must be re-greased only after repair work, using an acid-free multi-purpose lubricant.

In the description of the present repair manual, not all fastening parts might be mentioned. After repair, it might be necessary to check fastening parts regarding their factory-made laying, support and securing and to correct them respectively, if required.

Foreword

For proper functioning of the seat, it is important to carry out repair work of the pneumatic system by means of GRAMMER's special tool kit Praticco. The individual work steps are described in the operating instructions which are enclosed with the kit.

Bowden pull wires, cables and air hoses may only be fastened with cable ties at the defined spots by hand (loose). Make sure that Bowden pull wires, cables and air hoses cannot be squeezed or distorted when the seat suspension is adjusted and the seat moved.

Replace all removed old parts with enclosed new ones. If there is no new part included, the old one is to be cleaned and checked for its suitability for re-use. Defective parts and worn parts must be replaced by new ones.

Grammer AG rejects any warranty claims if damaged or worn parts and assemblies are not replaced by spare parts released by **Grammer** AG.

Qualified personnel

These instructions offer basic information on proper technical seat repair. The contents of the work procedures described are intended for professionally educated technicians with profound product knowledge. This level of knowledge is an imperative requirement when performing the work and procedures described in this document.

In order to avoid bodily injury, reduced operational safety of the seat suspension or damage to it resulting from improperly performed work, all information and instructions, in particular the safety instructions stated in Chapter 1, must be read carefully and strictly observed.

As an inevitable matter of fact, GRAMMER AG cannot evaluate all situations and consequences that may bear a risk of injury for the persons involved in the described work procedures. For this reason it is absolutely necessary that every person who carries out repair work at the seat suspension uses his/her professional knowledge to make sure that his/her own safety will not be put at risk and that the selected type of repair will not cause any negative effects, in particular with regard to technical safety.
For this reason, Grammer AG disclaims liability for any possible damage of this kind.

We point out explicitly that all work steps and procedures described are to be performed with consideration to the applicable directives and regulations stipulated by the relevant local authorities and in compliance with the provisions on health protection, prevention of accidents and environmental protection.

Change notification and copyright

The seat suspensions are subject to continuous development. Please understand that we must reserve the right to make changes in shape, equipment and technical design. For this reason, the contents of this repair manual cannot be used to substantiate any possible claims.

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1 Description

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Note:
Please refer to the applicable seat operating instructions for further details.

1.1 Safety instructions

1 All inspection, test and repair work must be performed exclusively by adequately trained personnel.

2 All work steps and procedures described are to be performed with consideration to the applicable directives and regulations stipulated by the relevant local authorities and in compliance with the provisions on health protection, prevention of accidents and environmental protection.

3 Special notes in this repair manual are highlighted as follows:

WARNING ...
indicates possible risks for persons and their prevention.

ATTENTION ...
indicates possible damage or deterioration of material and their prevention.

Note: …
introduces an additional explanation for better understanding of the work to be carried out.

Installation note: ...
introduces an additional explanation for better understanding the installation work to be carried out.

4 Before starting repair work, the following work has to be carried out:
- Disconnect the seat suspension from the power supply.
- Move the seat suspension to the end stops of the lower position.

5 When using oil, grease and other chemical substances, the relevant safety regulations for the handling and use of these products must be observed.

1.2 Rating plate

The rating plate is located on the back of the seat suspension in the top left corner.

The rating plate shows the following information (example):

(A) **Country of manufacture** = MADE IN XXXXXXX

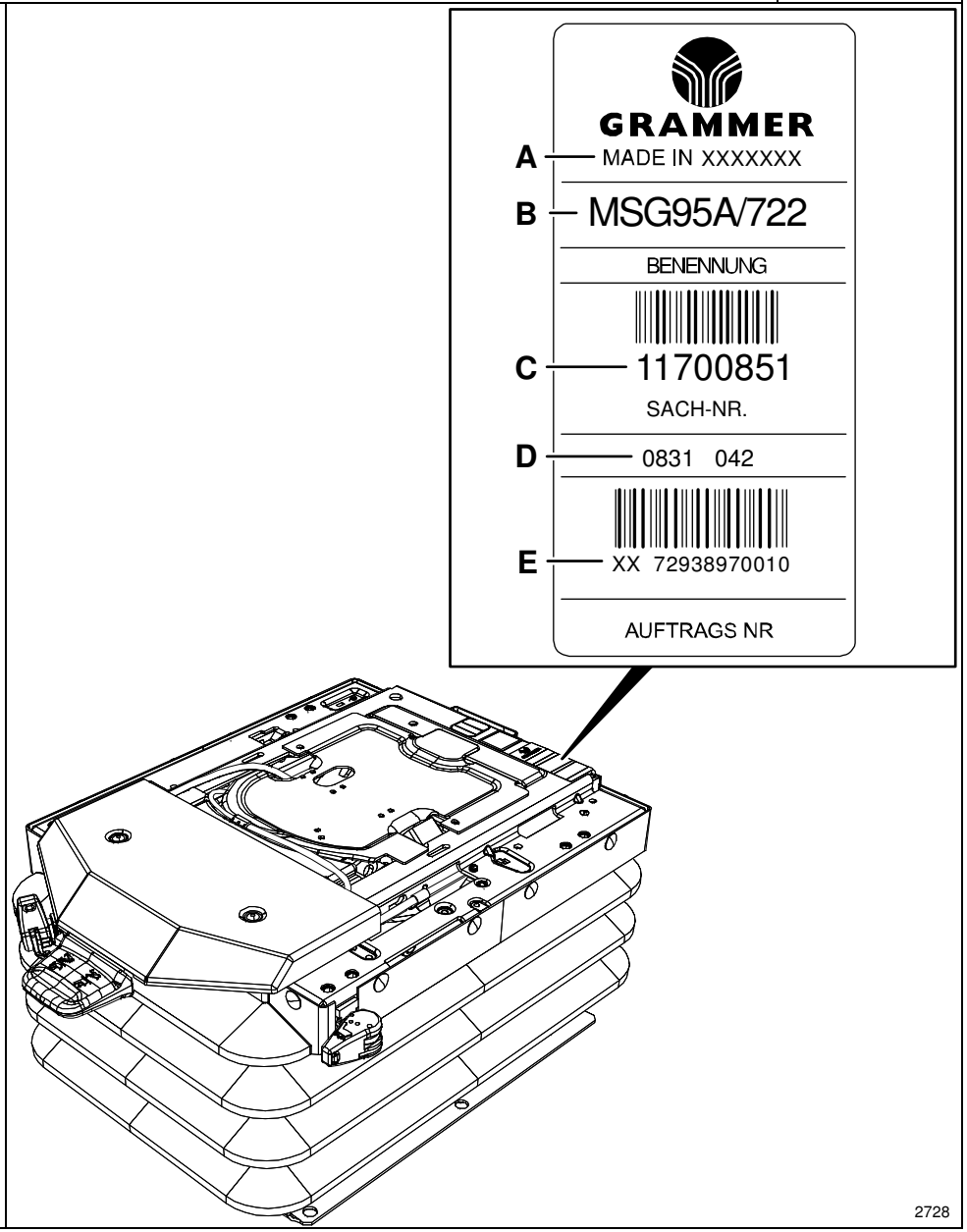
(B) **DESIGNATION** = MSG95G/722

(C) **INVENTORY NO** = 11700851

(D) **Year** / **CW** / **Assembly**
08 31 042:
- Year of manufacture = 08 (2008)
- Built in week = 31 (August)
- Assembly = 042

(E) (D) **ORDER NO.** = XX 72938970010
- Country indicator = XX

Note:
When orders are placed, the correct inventory no. (C) on the rating plate is always to be quoted.



2 Diagnosis

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2.1 Components overview

Pneumatic modules and connecting diagram

Seat suspension MSG95G with handle at the front (delivery option)

(1) Compressor

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.12 when pulling off the compressed air hose (7) at the connection of the compressor (1).

(2) Cable clamp

(3) Air spring for compressed air hose (6) – valve for height adjustment (4)

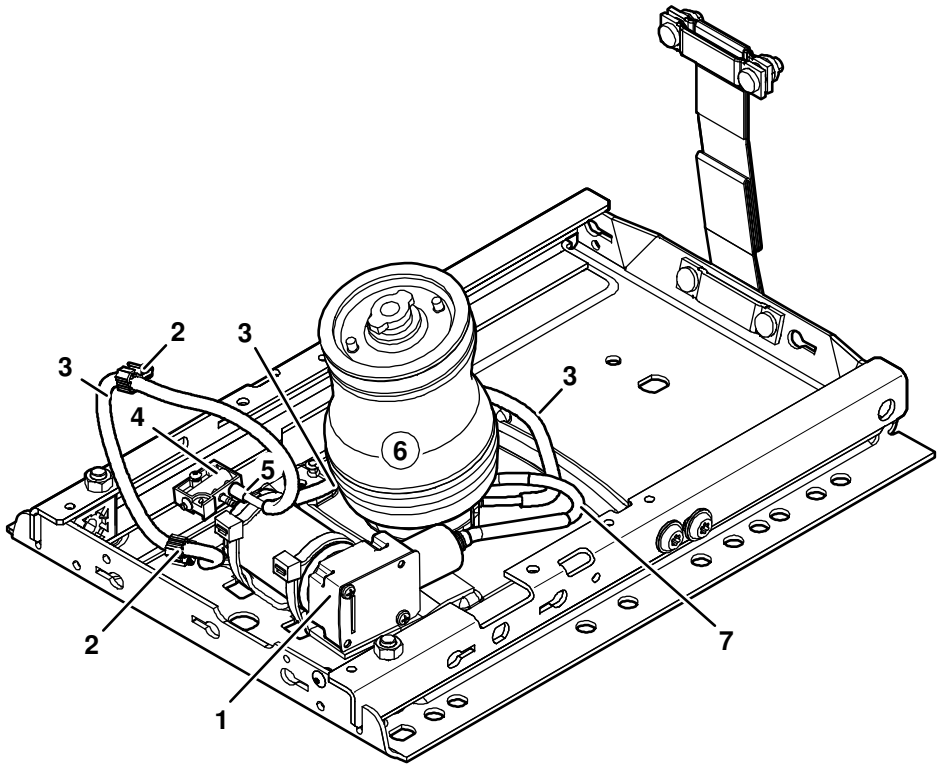
(4) Valve for height adjustment

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.19 when pulling off the compressed air hose (3) at the connection of the height adjustment valve (4).

(5) Hose nozzle

(6) Air spring

(7) Compressed air hose for compressor (1) – air spring (6).



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2.1 Components overview

Seat suspension MSG95GL with handle at the front (delivery option)

(1) Compressor

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.12 when pulling off the compressed-air hose (7) at the connection of the compressor (1).

(2) Hose nozzle

(3) Valve for height adjustment

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.19 when pulling off the compressed-air hose (5) at the connection of the valve (2).

(4) Cable clamp

(5) Additional air supply

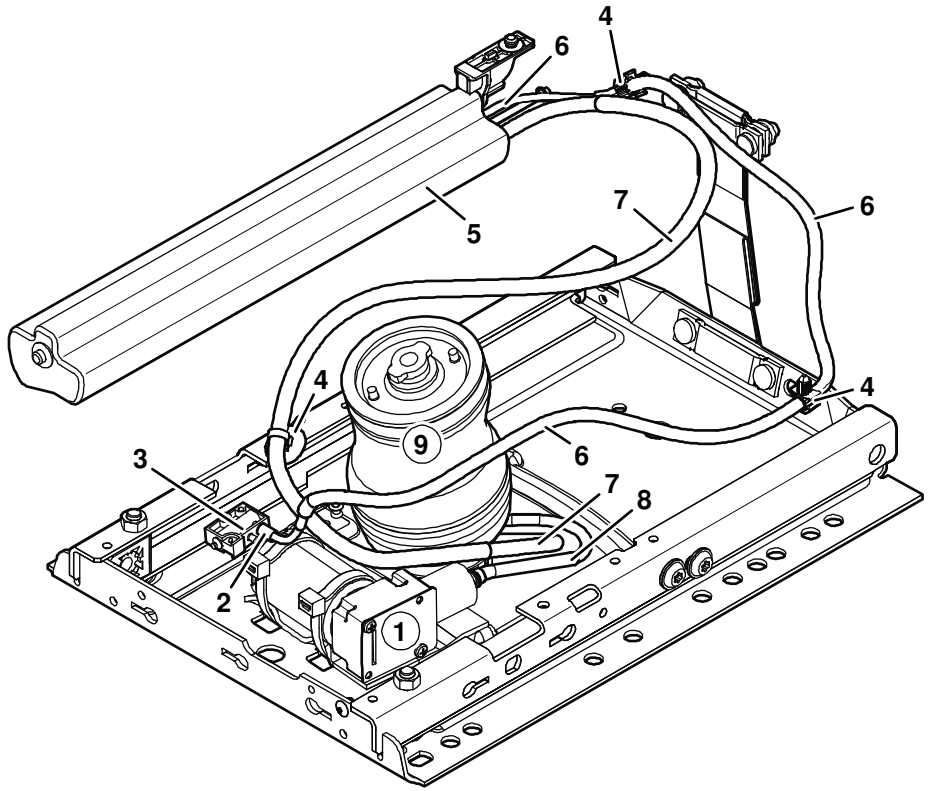
⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.17 when pulling off the compressed-air hose (5 and 6) at the connection of the compressor (4).

(6) Additional air supply for compressed air hose (4) – valve for height adjustment (2)

(7) Compressed air hose for air spring (8) – additional air supply (4).

(8) Compressed air hose for compressor (1) – air spring (8).

(9) Air spring



2.1 Components overview

Seat suspension MSG95G with handle on the left (delivery option)

Note:
Compressed-air hose (2) and the electrical cables leading to the compressor (1) are both directed in one tube (9).

(1) Compressor

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.12 when pulling off the compressed-air hose (7) at the connection of the compressor (1).

(2) Air spring for compressed air hose (7) – valve for height adjustment (6)

(3) Cable clamp

(4) L-bar with pipe container

(5) Hose nozzle

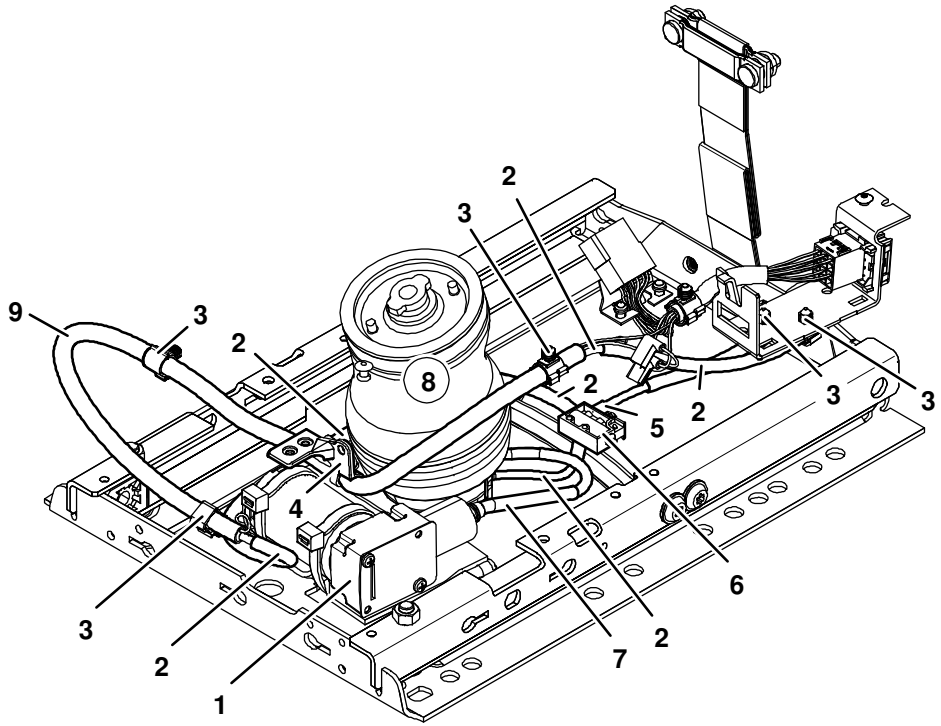
(6) Valve for height adjustment

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.19 when pulling off the compressed-air hose (2) at the connection of the valve (6).

(7) Compressed air hose for compressor (1) – air spring (8).

(8) Air spring

(9) Sleeve tube



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2.1 Components overview

Seat suspension MSG95GL with handle on the left (delivery option)

(1) Compressor

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.12 when pulling off the compressed-air hose (8) at the connection of the compressor (1).

(2) Cable clamp

(3) Additional air supply

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.17 when pulling off the compressed-air hose (5 and 5) at the connection of the compressor (3).

(4) Additional air supply for compressed air hose (3) – valve for height adjustment (7)

(5) Compressed air hose for air spring (9) – additional air supply (3).

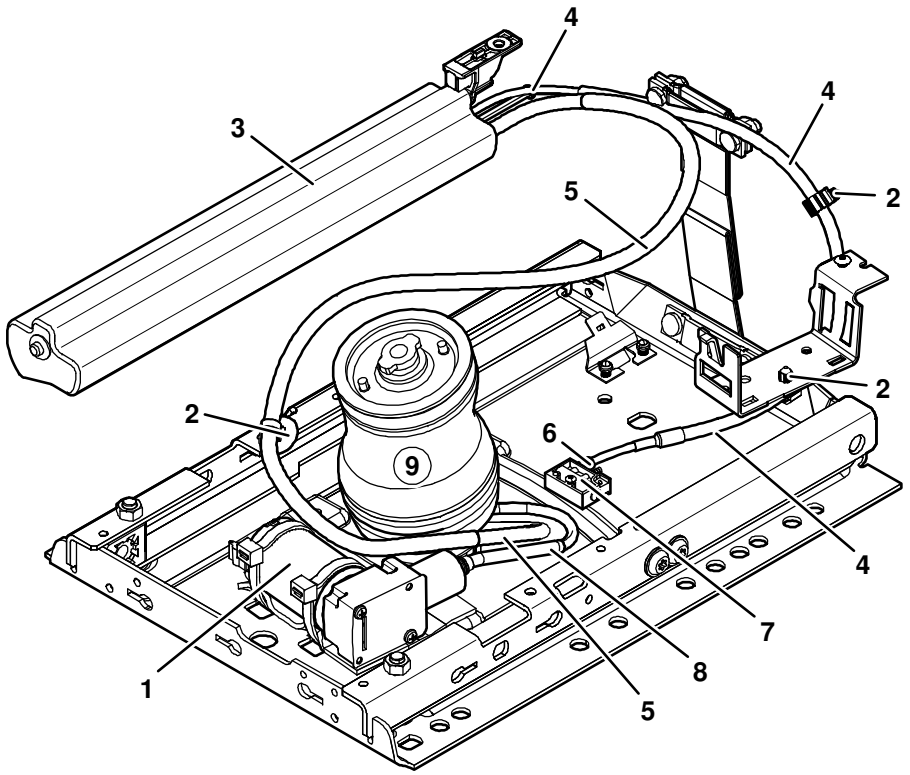
(6) Hose nozzle

(7) Valve for height adjustment

⚠ **ATTENTION** damage!
Please observe the notes stated in Chapter 3.19 when pulling off the compressed-air hose (4) at the connection of the height adjustment valve (4).

(8) Compressed air hose for compressor (1) – air spring (9).

(9) Air spring



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2.1 Components overview

Compressor, current path (compressor cable) and pin assignment

Seat suspension with handle at the front (delivery option)

(1) Compressor

(2) Right-angle plug (black line)

(3) Right-angle plug (blue line)

(4) Cable to compressor (1)

(5) Cable to micro-switch (6)

(6) Micro-switch

(7) Right-angle plug (red line)

(8) Right-angle plug (blue line)

(9) Cable to plug (11) at the U-profile (12).

(10) Pin assignment for the compressor at the plug (11)
Pin:
P1 (ground) and
P2 (voltage)

(11) Plug

(12) U-shaped profile

Electrical plug and socket connections:

(A) Electrical connection (blue line) between right-angle plug (8) and micro-switch (6)

(B) Electrical connection (red line) between right-angle plug (7) and micro-switch (6)

(C) Electrical connection (blue line) between right-angle plug (3) and compressor (1)

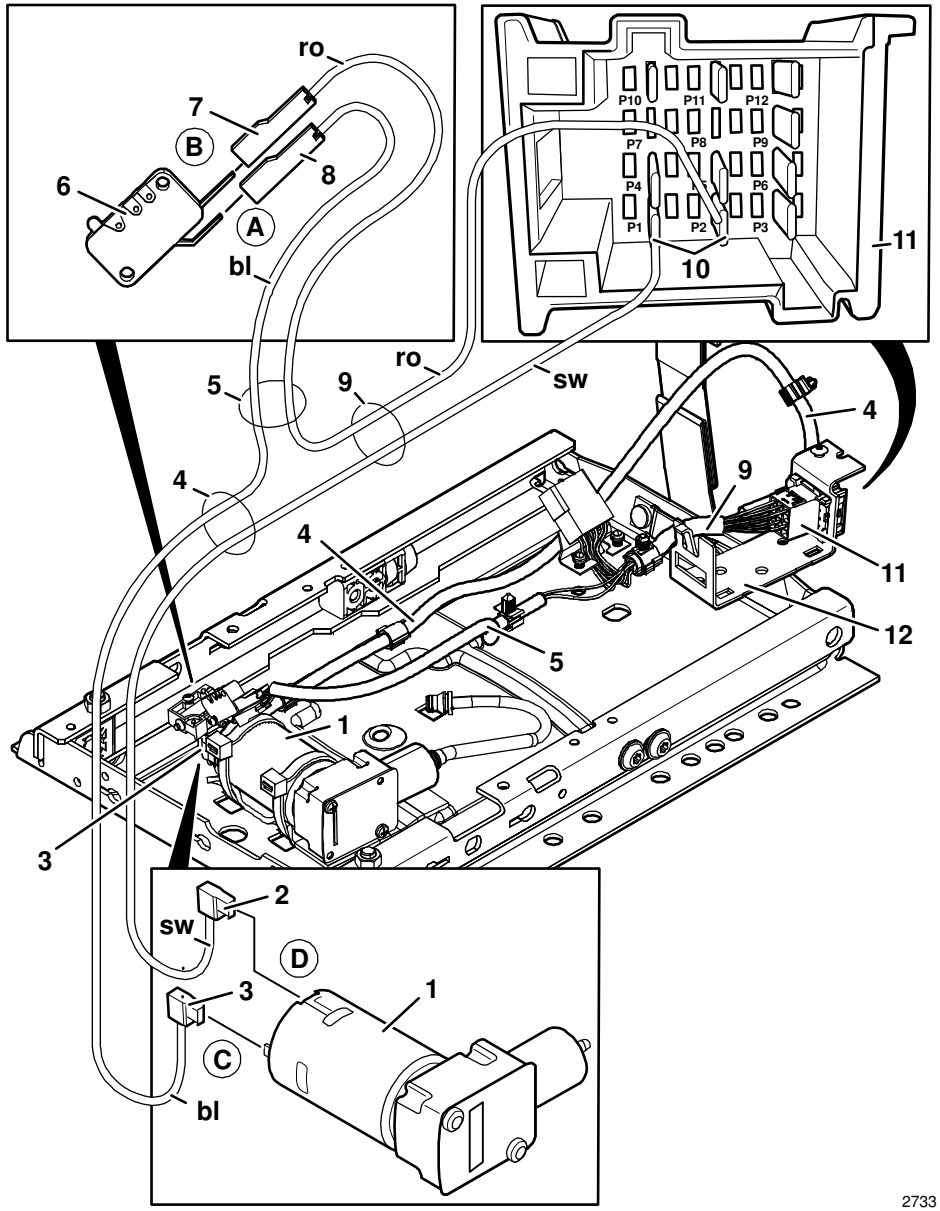
(D) Electrical connection (black line) between right-angle plug (2) and compressor (1)

Cable colours:

bl = blue

ro = red

sw = black



2.1 Components overview

Seat suspension MSG95G with handle on the left (delivery option)

Note:
The electrical cables (2) leading to the compressor (1) are together with the compressed-air hose (12) directed in one tube (13) (see pneumatic modules and connecting diagram).

(1) Compressor

(2) Compressor cable (1) – micro switch (11) with compressed-air line.

(3) Right-angle plug (black line)

(4) Right-angle plug (blue line)

(5) Pin assignment for the compressor at the plug (6)
Pin:
P1 (ground) and
P2 (voltage)

(6) Plug

(7) Cable to plug (61) at the U-profile (8).

(8) U-shaped profile

(9) Right-angle plug (red line)

(10) Right-angle plug (blue line)

(11) Micro-switch

(12) Air spring for compressed air hose – valve for height adjustment

(13) Sleeve tube

Electrical plug and socket connections:

(A) Electrical connection (blue line) between right-angle plug (10) and micro-switch (11)

(B) Electrical connection (red line) between right-angle plug (9) and micro-switch (11)

(C) Electrical connection (blue line) between right-angle plug (4) and compressor (1)

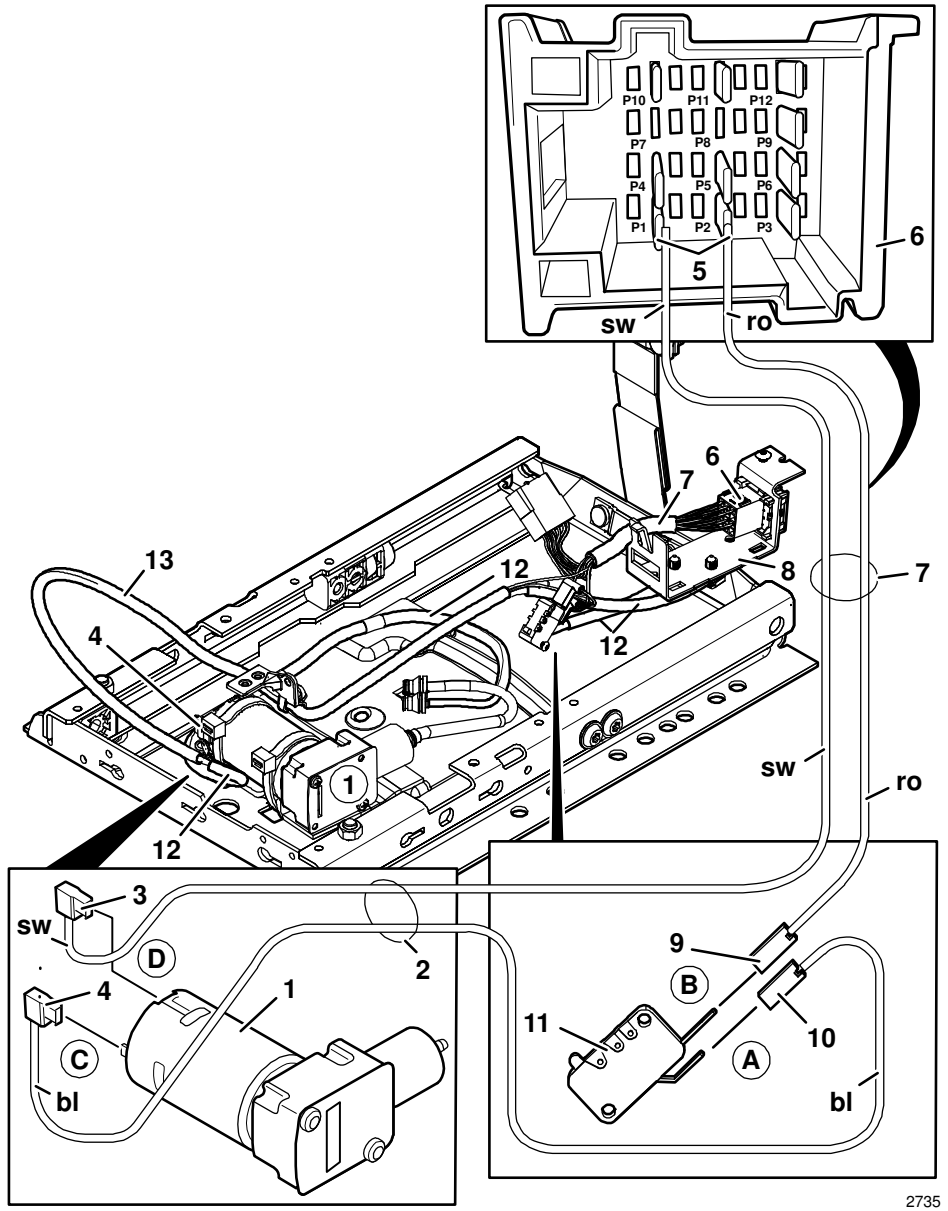
(D) Electrical connection (black line) between right-angle plug (3) and compressor (1)

Cable colours:

bl = blue

ro = red

sw = black



2.1 Components overview

Seat suspension MSG95GL with handle on the left (delivery option)

(1) Compressor

(2) Compressor cable (1) – micro switch (11).

(3) Right-angle plug (black line)

(4) Right-angle plug (blue line)

(5) Pin assignment for the compressor at the plug (6)
Pin:
P1 (ground) and
P2 (voltage)

(6) Plug

(7) Cable to plug (61) at the U-profile (8).

(8) U-shaped profile

(9) Right-angle plug (red line)

(10) Right-angle plug (blue line)

(11) Micro-switch

Electrical plug and socket connections:

(A) Electrical connection (blue line) between right-angle plug (10) and micro-switch (11)

(B) Electrical connection (red line) between right-angle plug (9) and micro-switch (11)

(C) Electrical connection (blue line) between right-angle plug (4) and compressor (1)

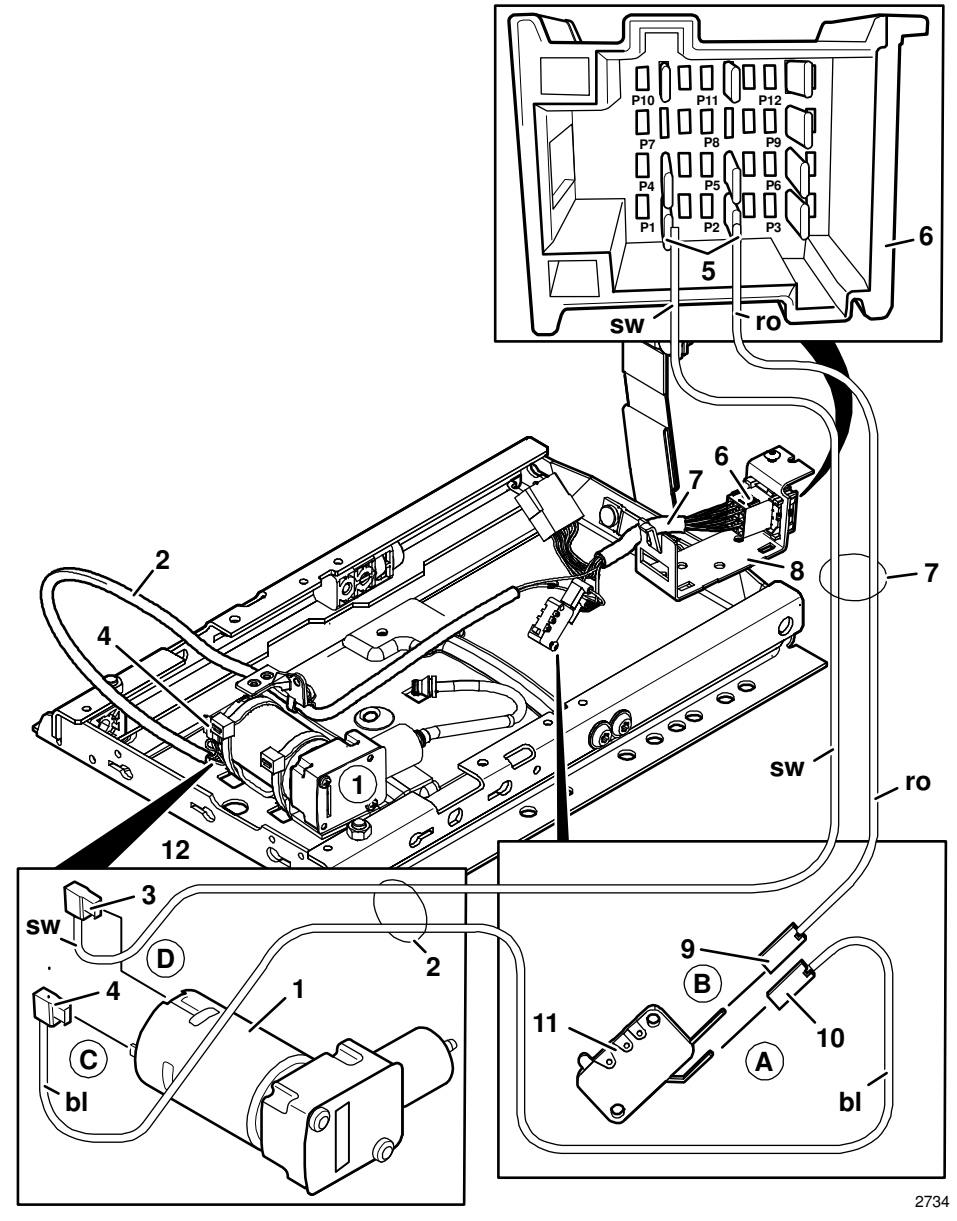
(D) Electrical connection (black line) between right-angle plug (3) and compressor (1)

Cable colours:

bl = blue

ro = red

sw = black



2.1 Components overview

Cable harness for seat suspension and pin assignment

(1) Cable harness for seat suspension

(2) Plug of cable harness for seat suspension (8-pin)

(3) Plug of cable harness for seat suspension (12-pin)

(4) U-shaped profile

(5) Right-angle plug (blue line) voltage at the compressor

(6) Right-angle plug (black line) ground at the compressor

(7) Right-angle plug (blue line) voltage at the micro-switch

(8) Right-angle plug (red line) voltage at the connector for cable harness of seat suspension (3) pin assignment (+)

(9) Pin assignment for the heater at the cable harness of seat suspension (2)
Pin:
P6 (ground) and
P8 (voltage)

(10) Pin assignment for the lumbar support at the cable harness of seat suspension (2)
Pin:
P6 (ground) and
P7 (voltage)

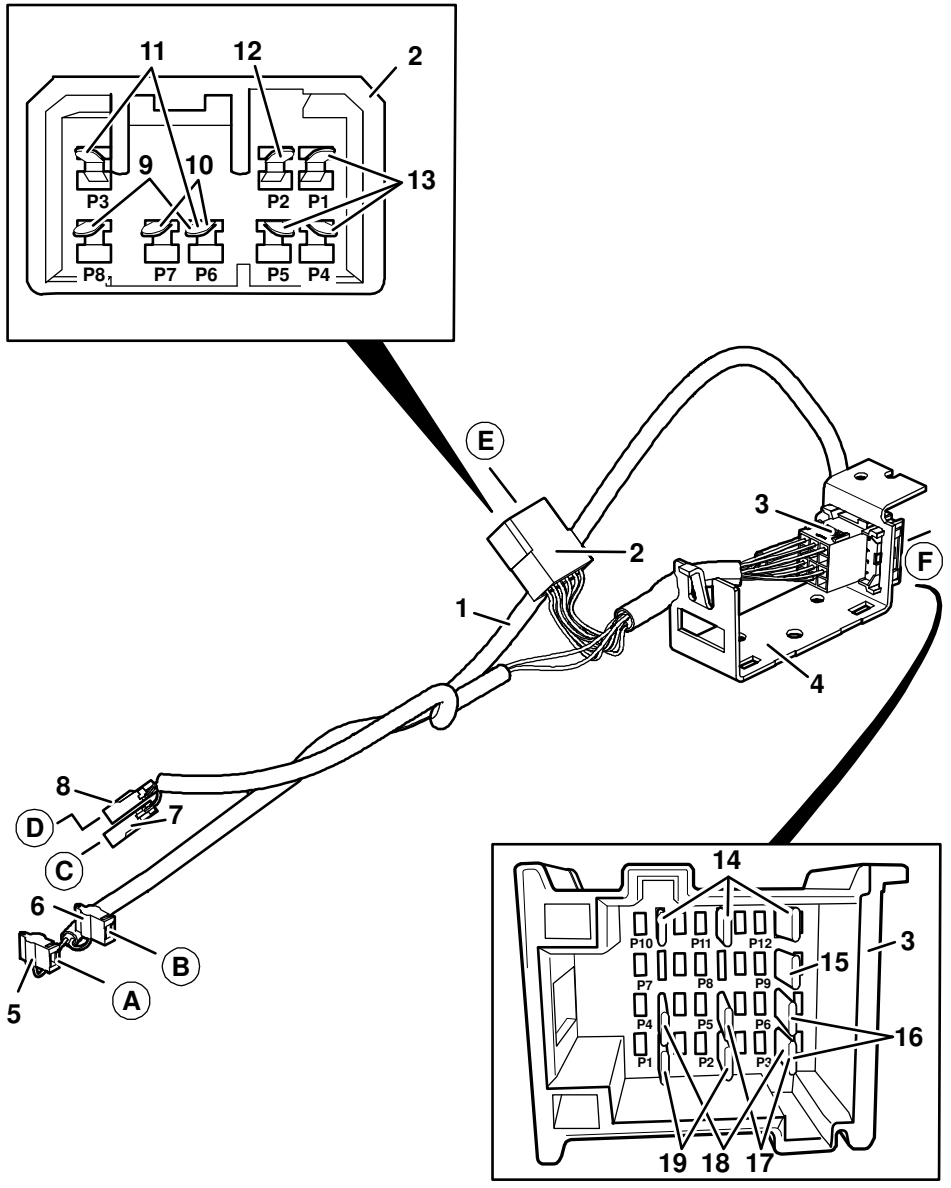
(11) Pin assignment for climate control system at the cable harness of seat suspension (2)
Pin:
P6 (ground) and
P3 (voltage)

(12) Pin assignment for belt buckle contact at cable harness of seat suspension (2)
Pin:
P2 (belt buckle contact signal)

(13) Pin assignment for seat occupancy detection system at the cable harness of seat suspension (2)
Pin:
P1 (signal B)
P4 (signal A)
P5 (signal C)

(14) Pin assignment for seat occupancy detection system at the cable harness of seat suspension (3)
Pin:
P10 (signal A)
P11 (signal C)
P12 (signal B)

(15) Pin assignment for belt buckle contact at cable harness of seat suspension (3)
Pin:
P9 (belt buckle contact signal)



2.1 Components overview

(16) Pin assignment for the heater at the cable harness of seat suspension (3)
Pin:
P3 (ground) and
P6 (voltage)

(17) Pin assignment for the lumbar support at the cable harness of seat suspension (3)
Pin:
P3 (ground) and
P5 (voltage)

(18) Pin assignment for climate control system at the cable harness of seat suspension (3)
Pin:
P3 (ground) and
P4 (voltage)

(19) Pin assignment for compressor at the cable harness of seat suspension (3)
Pin:
P1 (ground) and
P2 (voltage)

Electrical plug and socket connections:

(A) Electrical connection (blue cable) between right-angle plug (5) and compressor

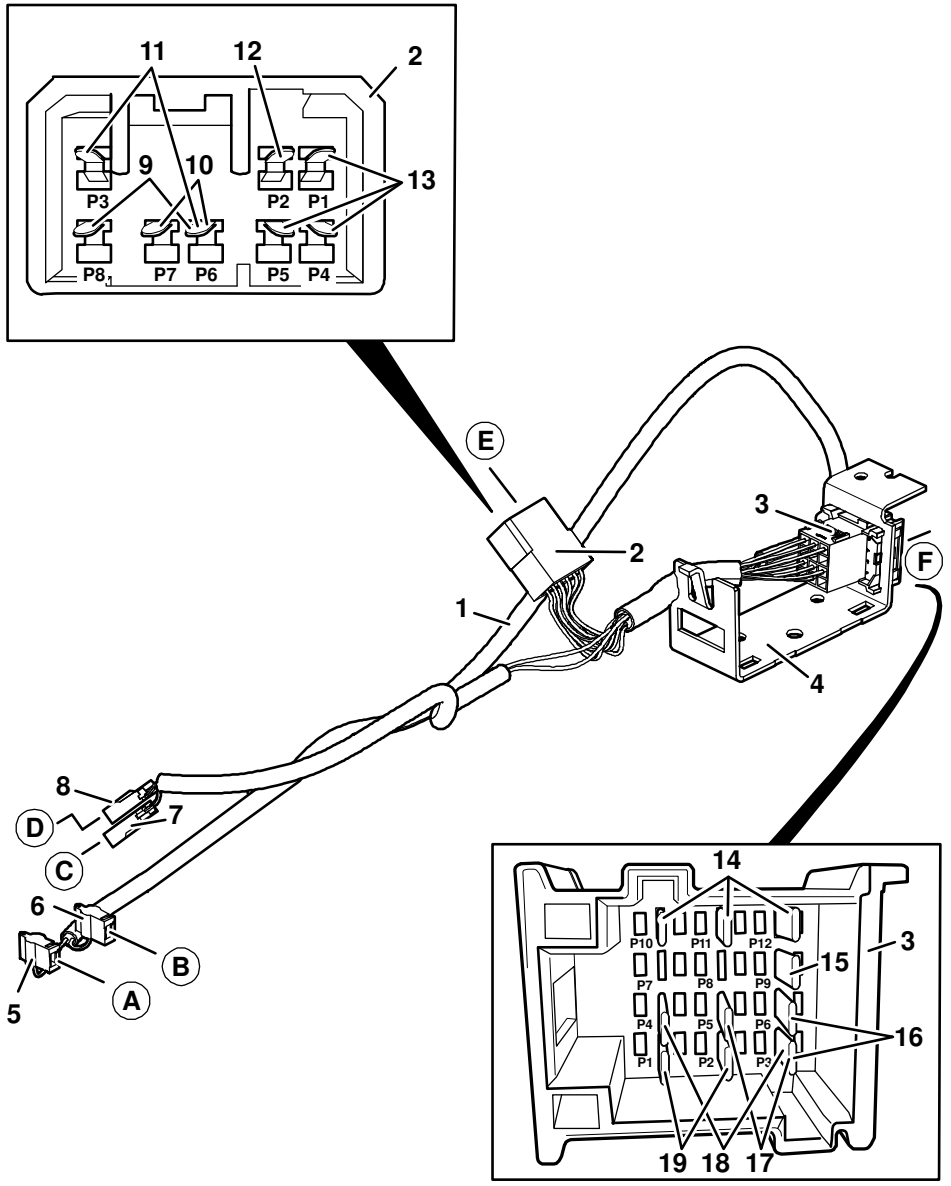
(B) Electrical connection (black cable) between right-angle plug (6) and compressor

(C) Electrical connection (red cable) between right-angle plug (7) and micro-switch for height adjustment

(D) Electrical connection (blue cable) between right-angle plug (8) and micro-switch for height adjustment

(E) Electrical connection (8-pin) between cable harness plug for seat suspension (2) and cable harness socket for upper seat part

(F) Electrical connection (12-pin) between cable harness plug for seat suspension (3) and cable harness socket for vehicle connection



2.2 Overview of faults – Pointing out possible faults that might occur

This chapter contains notes on possible faults of the seat suspension. The notes and information provided in Chapter 2.4 "Fault Diagnosis" are intended to ease troubleshooting of faults.

Faults caused due to insufficient maintenance or improper repair are not covered here.

Note: The components mentioned above are illustrated in Chapter 2.1, if not stated otherwise in this text.

Fault description	Possible cause	Troubleshooting
Seat suspension does not respond when operating the handle for height adjustment in upward direction	• Compressor is not active.	Check the compressor / compressor cable (Chapter 2.3, step no. 1.1).
	• The right-angle plug at the micro-switch or compressor is not connected correctly.	Check the plug-in connectors and establish the connection, if necessary.
	• Micro-switch is defective.	Check the micro-switch (Chapter 2.3, inspection step no. 2.1).
	• No voltage.	Check the cable harness for seat suspension (Chapter 2.3, inspection step no. 3.1).
Seat suspension does not respond when operating the handle for height adjustment in downward direction.	• Valve for height adjustment is defective.	Check pneumatic air system (Chapter 2.3, inspection step no. 4.1).
Seat suspension changes its position while driving, deflates and lowers down.	• Compressed-air hose connections are leaky.	Check all compressed-air hose connections for air leakage and, if necessary, seal leaky connections professionally.
	• Compressed-air hoses are leaky	Check pneumatic air system (Chapter 2.3, inspection step no. 4.1).
	• Air spring is leaky.	Replace the air spring (Chapter 3.16).
	• Additional air supply is leaky.	Replace the additional air supply (Chapter 3.17).
	• Valve for height adjustment is leaky.	Replace the height adjustment valve (see Chapter 3.19).
	• Compressor is leaky (return valve).	Replace the compressor (Chapter 3.12).

2.2 Overview of faults – Pointing out possible faults that might occur

Fault description	Possible cause	Troubleshooting
Height adjustment upwards: compressor runs, but seat suspension is not lifted	• Air system is leaky.	Check pneumatic air system (Chapter 2.3, inspection step no. 4.1).
Seat moves up automatically (compressor does not switch off).	• Micro-switch is defective.	Check the micro-switch (Chapter 2.3, inspection step no. 2.1).
	• Cable-break or short-circuit (e.g. caused by abrasion at the cable harness).	Replace the seat suspension (Chapter 3.21).
Compressor is not running.	• No voltage at the compressor.	Check the compressor / compressor cable (Chapter 2.3, step no. 1.1).
Seat suspension travels up and down and hits the upper and lower end stop.	• Vertical shock absorber is defective.	Replace the vertical shock absorber (Chapter 3.7).
	• Air spring is leaky.	Replace the air spring (Chapter 3.16).
	• Additional air supply is leaky.	Replace the additional air supply (Chapter 3.17).
	• Compressed-air hose connections are leaky.	Check all air hose connections for air leakage and replace the component showing a defective air connection with a new one, if necessary.
	• Compressed-air hoses are leaky	Check pneumatic air system (Chapter 2.3, inspection step no. 4.1).
	• Compressor is defective.	Check the compressor (Chapter 2.3, step no. 1.1).

2.3 Troubleshooting – Locating the fault

Preconditions for fault diagnosis for each test:

- The individual functions are activated in compliance with the instructions of the seat operating instructions.
- The electrical system of the vehicle has been inspected and found to be OK in compliance with the vehicle operating instructions.
- Electrical connection at the components produced according to instruction and locked, if possible.
- Cable harness for seat suspension has been inspected with regard to arcing spots and broken leads (kinks) and found to be OK.
- Ignition switched off (no voltage that might cause a current flow must be applied to the seat suspension).

1 Inspection of compressor and current path (compressor cable)

Preconditions for fault diagnosis:

- The micro-switch has been inspected and found to be OK.
- Pneumatic air system has been inspected and found to be OK.

Note: The components stated above are illustrated in Chapter 2.1.

Step no.	Inspect/operate	Result/specified status	Troubleshooting
1.1	• Disconnect the electrical connection (F) between the cable harness plug for seat suspension and the cable harness socket for the vehicle connection. • Connect the multimeter to pin P1 and P2 in the cable harness plug of the seat suspension (12-pin). • Pull the height adjustment handle up and measure the resistance at the pins P1 and P2 in the cable harness plug of the seat suspension (12-pin) (pin assignment for compressor): P1 Ω P2	**= 1.5 Ω (± 10%)** (total resistance of compressor cable, micro-switch and compressor)	Proceed with inspection step no. 1.3.
		>> 1.5 kΩ (→ ∞) (break) or << 1.5 kΩ (→ 0) (short-circuit)	Proceed with inspection step no. 1.2.

2.3 Troubleshooting – Locating the fault

Step no.	Inspect/operate	Result/specified status	Troubleshooting
1.2	• Disconnect the electrical connection between the right-angle plugs (black and blue cables) and the compressor. • Measure the resistance at the contacts of the compressor (2-pin): Contact Ω Contact	**= 1.3 Ω (± 10%)** (total resistance of compressor cable, micro-switch and compressor)	Replace the cable harness of the seat suspension (Chapter 3.21).
		>> 1.3 kΩ (→ ∞) (break) or << 1.3 kΩ (→ 0) (short-circuit)	Replace the compressor (Chapter 3.12).
1.3	• Restore the electrical connection (F) between the cable harness plug for seat suspension and the cable harness socket for the vehicle connection. • Switch the ignition on • Pull up the handle for height adjustment.	Compressor is running and seat suspension moves upwards.	End of inspection.
		Compressor is running and seat suspension does not move upwards; compressor is leaky (return valve).	Replace the compressor (Chapter 3.12).
		Compressor is not running.	Proceed with inspection step no. 1.4.
1.4	⚠ **WARNING** - Risk of injury! Due not operate the cam switch at the micro-switch manually, but operate it carefully by means of an appropriate tool.	Compressor is running and seat suspension moves upwards.	Replace the holder for height adjustment (Chapter 3.19).
		Compressor is running and seat suspension does not move upwards; compressor is leaky (return valve).	Replace the holder for height adjustment (Chapter 3.19) and compressor (Chapter 3.12).
		Compressor is not running.	Replace the compressor (Chapter 3.19).

2 Inspection of the micro-switch

Note: The components stated above are illustrated in Chapter 2.1.

Step no.	Inspect/operate	Result/specified status	Troubleshooting
2.1	• Disconnect the electrical connections (A) and (B) between the right-angle plugs (red and blue cables) and the micro-switch. • Measure the resistance at the contacts K1 and K2 of the micro-switch: K1 Ω K2	**>> 1 Ω (→ ∞)** (break) ≤ 1 Ω (→ 0) (short-circuit)	Proceed with inspection step no. 2.2. Micro-switch is defective. Replace the holder for height adjustment (Chapter 3.19).
2.2	• Pull up the handle for height adjustment. • Measure the resistance at the contacts K1 and K2 of the micro-switch: K1 Ω K2	**= 0.2 Ω (± 10%)** (total resistance of micro-switch) >> 0.2 Ω (→ ∞) (break) or << 0.2 Ω (→ 0) (short-circuit)	End of inspection. Micro-switch is defective. Replace the holder for height adjustment (Chapter 3.19).

3 Inspection of the cable harness for seat suspension

Preconditions for fault diagnosis:

- Upper seat part removed at the seat suspension and put aside (see Chapter 3.1).
- The micro-switch has been inspected and found to be OK.
- Compressor and current path have been inspected and found to be OK.
- Pneumatic air system has been inspected and found to be OK.

Note: The components stated above are illustrated in Chapter 2.1.

Step no.	Inspect/operate	Result/specified status	Troubleshooting
3.1	• Disconnect the electrical connection (F) between the cable harness plug for seat suspension and the cable harness socket for the vehicle connection. • Disconnect the electrical connection (E) between the cable harness plug for seat suspension and the cable harness socket for the upper seat part. • Bridge the pins P6 and P8 in the plug of the cable harness for the seat suspension (8-pin). • Measure the resistance at pins P3 and P6 in the plug of the cable harness for the seat suspension (12-pin) (pin assignment for the heater): P3 **Ω** P6	**<< 1 Ω (R→ 0)** (pass) ≥ 1 Ω (R→∞) (break)	Proceed with inspection step no. 3.2. Replace the cable harness of the seat suspension (Chapter 3.21).

2.3 Troubleshooting – Locating the fault

Step no.	Inspect/operate	Result/specified status	Troubleshooting
3.2	• Bridge the pins P6 and P7 in the cable harness plug for the seat suspension (8-pin). • Measure the resistance at pins P3 and P5 in the cable harness plug for the seat suspension (12-pin) (pin assignment for the lumbar support): P3 Ω P5	**<< 1 Ω (R→ 0)** (pass) ≥ 1 Ω (R→∞) (break)	Proceed with inspection step no. 3.3. Replace the cable harness of the seat suspension (Chapter 3.21).
3.3	• Bridge the pins P6 and P3 in the cable harness plug for the seat suspension (8-pin). • Measure the resistance at the pins P3 and P4 in the cable harness plug for the seat suspension (12-pin) (pin assignment for the climate control system): P3 Ω P4	**<< 1 Ω (R→ 0)** (pass) ≥ 1 Ω (R→∞) (break)	Proceed with inspection step no. 3.4. Replace the cable harness of the seat suspension (Chapter 3.21).
3.4	• Measure resistance between pins P1, P2, P4 and P5 in the cable harness plug for the seat suspension (8-pin) and the pins P12, P9, P10 and P11 in the cable harness plug for the seat suspension (12-pin) (pin assignment for seat occupancy detection system / belt contact / belt buckle contact): P1 Ω P12 P2 Ω P9 P4 Ω P12 P5 Ω P12	<< 1 Ω (R→ 0) (pass) ≥ 1 Ω (R→∞) (break)	End of inspection. Replace the cable harness of the seat suspension (Chapter 3.21).

4 Inspection of the pneumatic air system

Preconditions for fault diagnosis:

- Bellows at the upper suspension part removed (see Chapter 3.4) and pressed down.
- Compressor and current path have been inspected and found to be OK.

Note: The components stated above are illustrated in Chapter 2.1.

Step no.	Inspect/operate	Result/specified status	Troubleshooting
4.1	Apply load to seat suspension and check compressed air hoses for kinks and leakage.	Compressed-air hoses are tight	Proceed with inspection step no. 4.2.
		Compressed-air hose is leaky	Replace the compressed air hose (see Chapter 3.15).
		Air hose connection is leaky.	Professionally seal the connection or replace it (see Chapter 3.15).
4.2	Check the air spring for visible damage (e.g. abrasion) and tightness.	Air spring is tight.	Proceed with inspection step no. 4.3.
		Air spring is leaky.	Replace the air spring (Chapter 3.16).
4.3	**Seat suspension MSG95GL:** Apply load to seat suspension and check additional air supply for leakage.	Additional air supply is tight. Air escapes at the additional air supply.	Proceed with inspection step no. 4.4. Replace the additional air supply (Chapter 3.17).
4.4	Apply load to seat suspension and check height adjustment valve for leakage.	Air escapes from the valve for height adjustment.	Replace the height adjustment valve (see Chapter 3.19).
		Valve for height adjustment is tight.	End of inspection.

3 Repair work

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* Delivery option

3 Repair work

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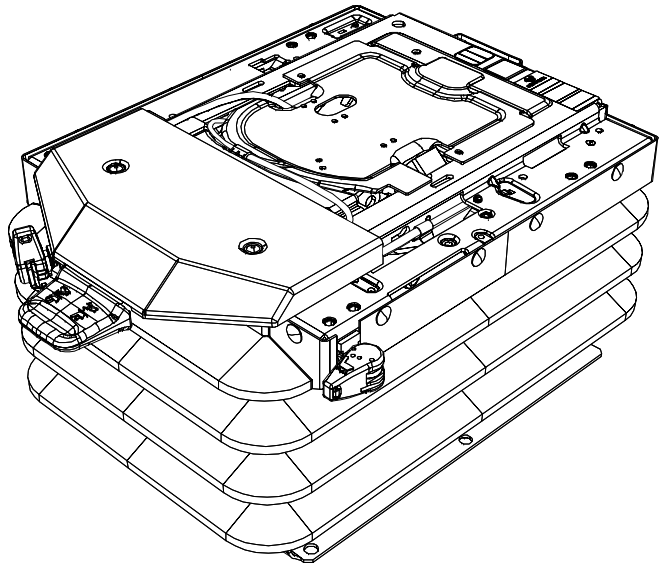
3.1 Seat suspension, removal and installation (see repair manual for the upper part of the seat)

Note:
For the removal and installation of the seat suspension at the vehicle, ask the vehicle manufacturer for the necessary assembly work to be carried out.



3.2 Top cover – removal and installation

Removal and installation

1 Remove the upper seat part at the seat suspension and put it aside (see Chapter 3.1).
Notes:
● Cable ties at cable harness for upper seat part need not be removed and the electrical connection need not be disconnected.
● Do not overstretch the cable tree for the upper seat part when putting it aside.

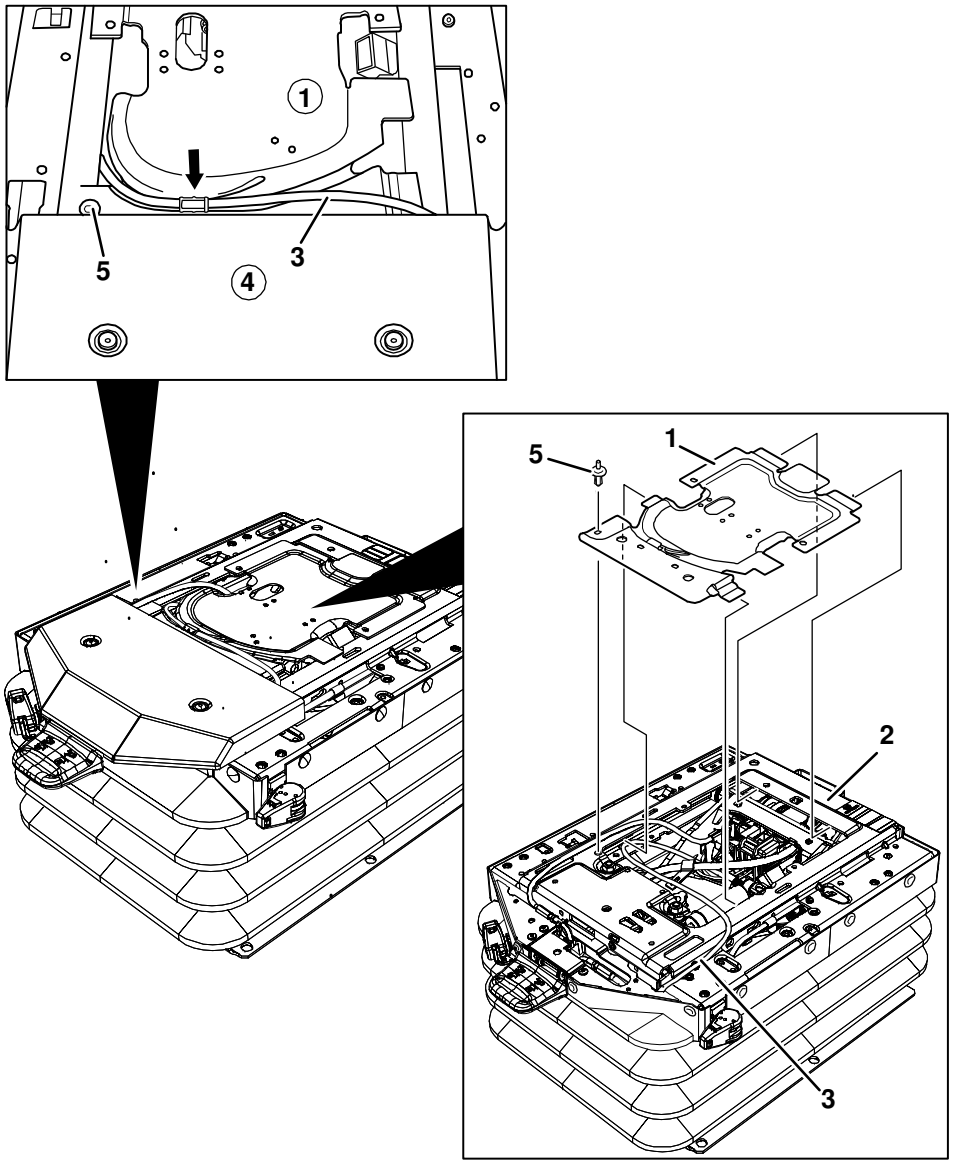
2 Knock out the expanding rivet (5).
Note for handle at the front:
In order to make the expanding rivet (5), which is partly covered by the front cover (4), accessible for removal and installation, carefully bend the front cover (4) upwards in the area of the expanding rivet (7).
Installation note:
Replace the expanding rivet (5).

3 Detach (arrow) the Bowden pull wire (3) at the top cover (1).

4 Pull out four lugs of the top cover (1) at the upper suspension part (2).

5 Remove the top cover (1).

6 Re-install the components in the reverse order of their removal.



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3.3 Front cover – removal and installation – with handle at the front

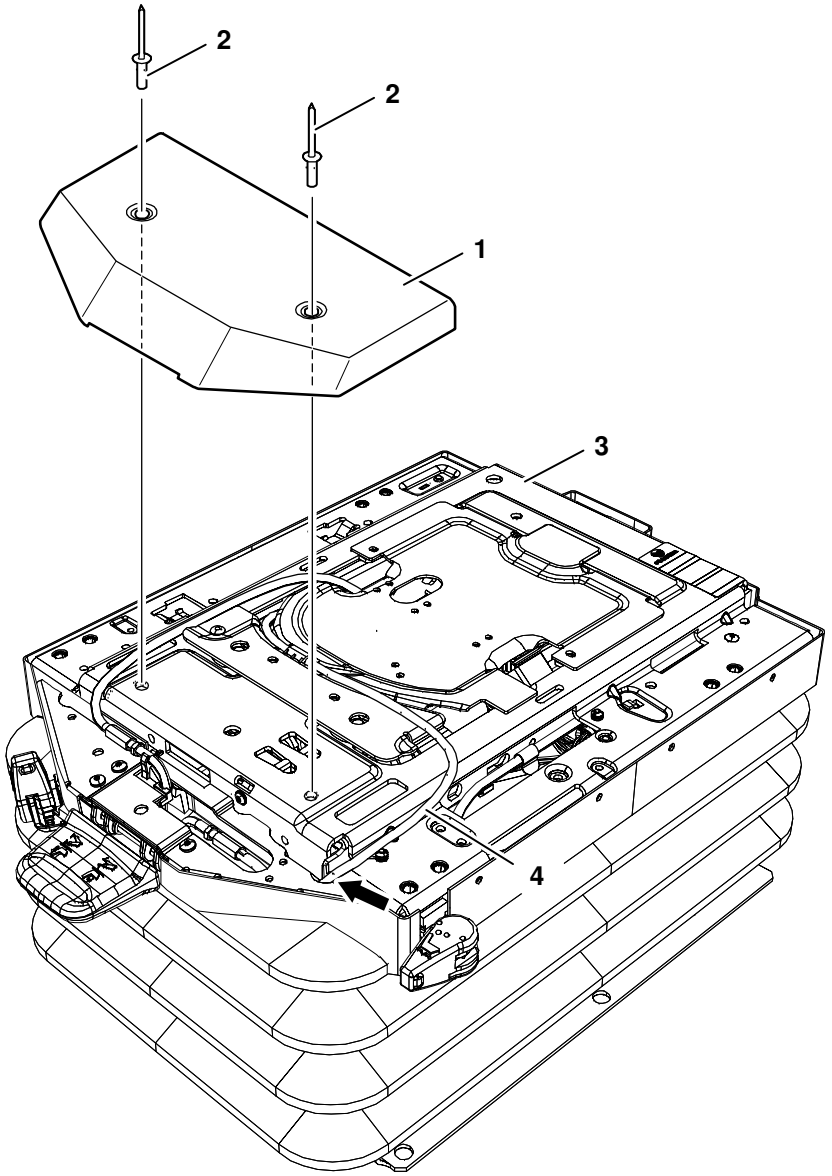
Removal and installation

1 Remove the upper seat part at the seat suspension and put it aside (see Chapter 3.1).
Notes:
● Cable ties at cable harness for upper seat part need not be removed and the electrical connection need not be disconnected.
● Do not overstretch the cable tree for the upper seat part when putting it aside.

2 Bore out the two rivet heads and drive out the blind rivets (2).

3 Remove the front cover (1) from the upper suspension part (3).
Note:
The Bowden pull wire for vertical shock absorber adjustment(4) runs left (arrow) under the front cover (1)

4 Re-install the components in the reverse order of their removal.



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3.4 Bellows – removal and installation

Removal and installation

1 Remove the seat suspension (Chapter 3.1).

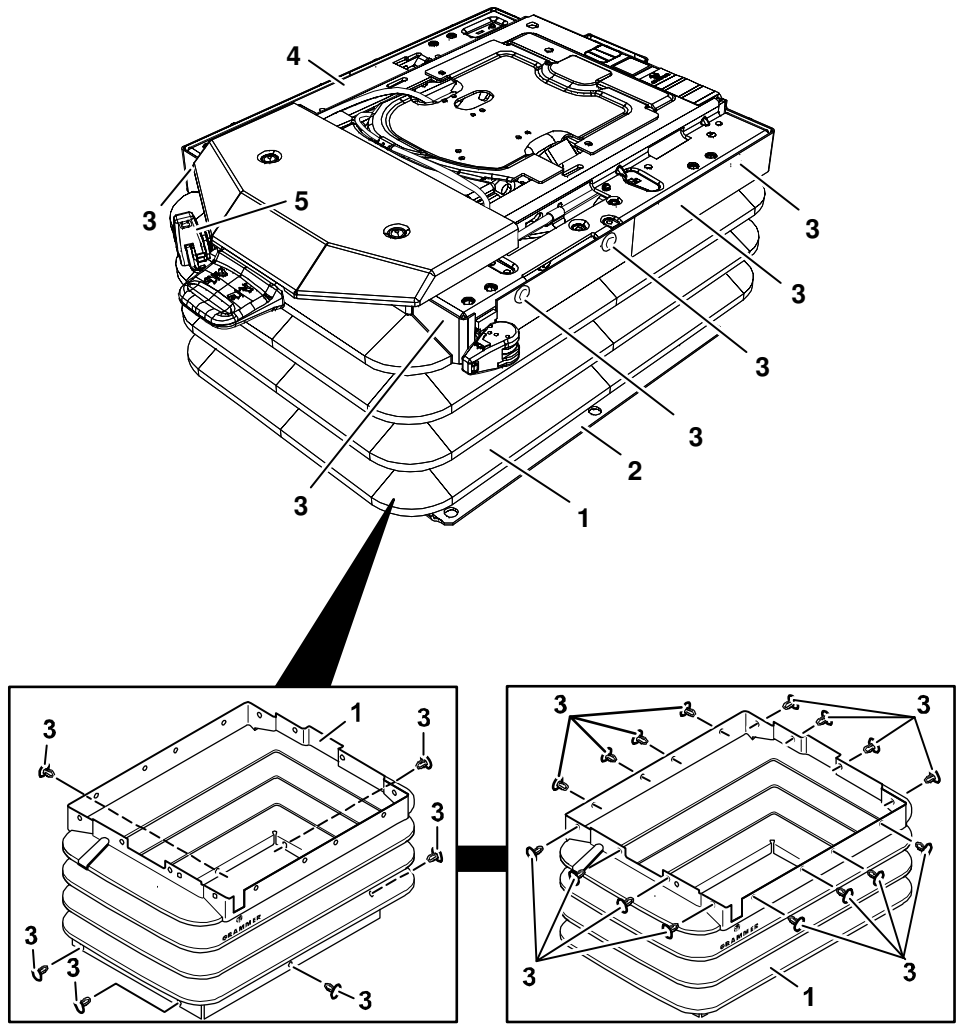
2 Pull out sixteen bellows pins (3) from the upper suspension part (4).

3 Pull out six bellows pins (3) at the lower suspension part (2).

4 Handle at the front:
Pull the bellows (1) over the handle for vertical shock absorber adjustment (5).

5 Pull the bellows (1) in downward direction over the lower suspension part (2) and remove it.

6 Re-install the components in the reverse order of their removal.



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3.5 Handle for vertical shock absorber adjustment – removal and installation (delivery option)

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3.5.1 Front handle for vertical shock absorber adjustment – removal and installation

Removal and installation

1 Remove the bellows at the front of the upper suspension part (see Chapter 3.4) and press it down.

2 Turn the handle for vertical shock absorber adjustment (1) to the right.

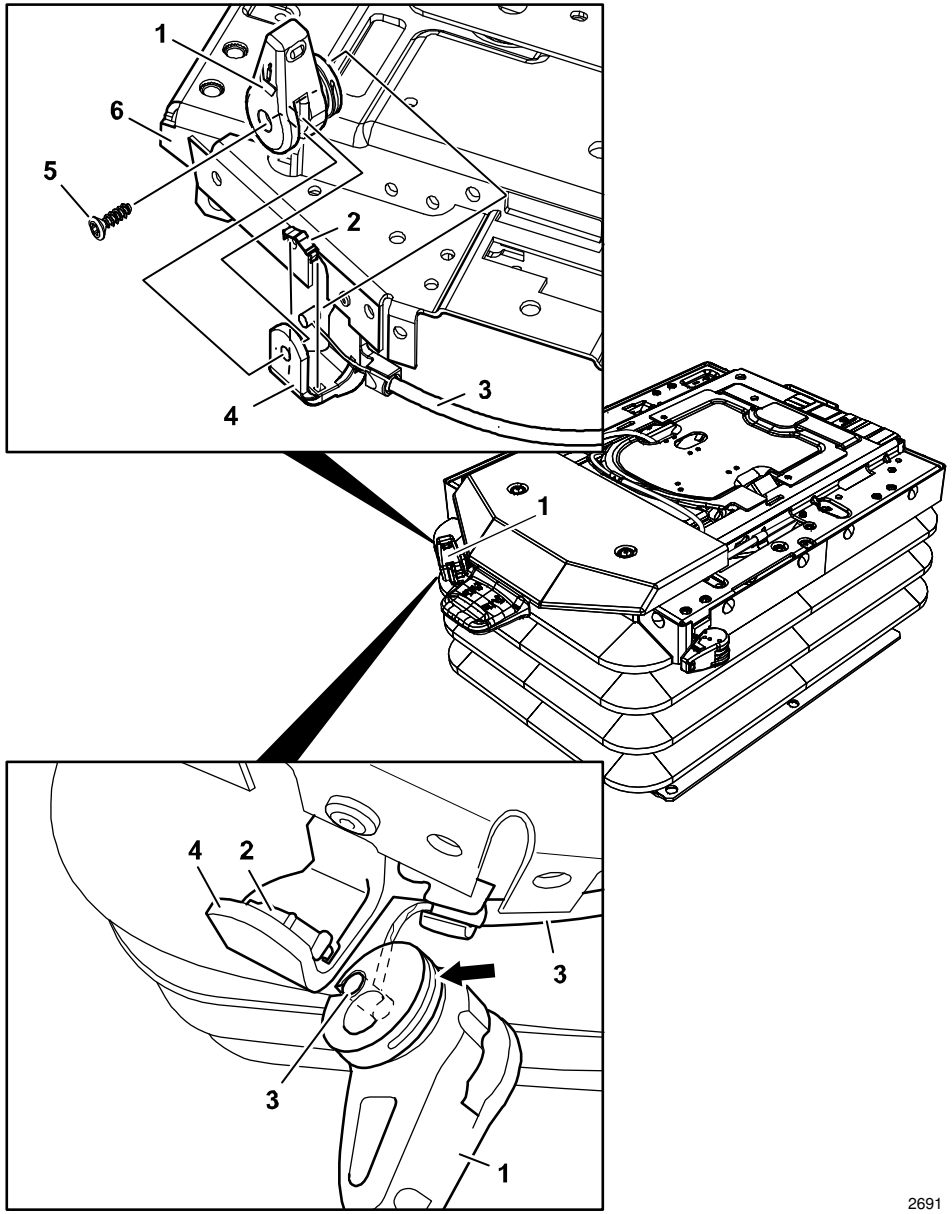
3 Unscrew the rounded head screw (5).
Installation note:
Rounded head screw (5), 2.5 Nm.

4 Pull off the handle for vertical shock absorber adjustment (1) at the L-bar (4).
Installation note:
Apply acid-free multi-purpose lubricant to the L-bar (4) in the rotary motion area.

5 Detach the Bowden pull wire (3).
Installation note:
Ensure that the wire of the Bowden pull wire (3) runs in the groove (arrow) of the handle for vertical shock absorber adjustment (1).

6 Pull off the catch spring (2) at the L-bar (4).

7 Re-install the components in the reverse order of their removal.



3.5.2 Left handle for vertical shock absorber adjustment – removal and installation

Removal and installation

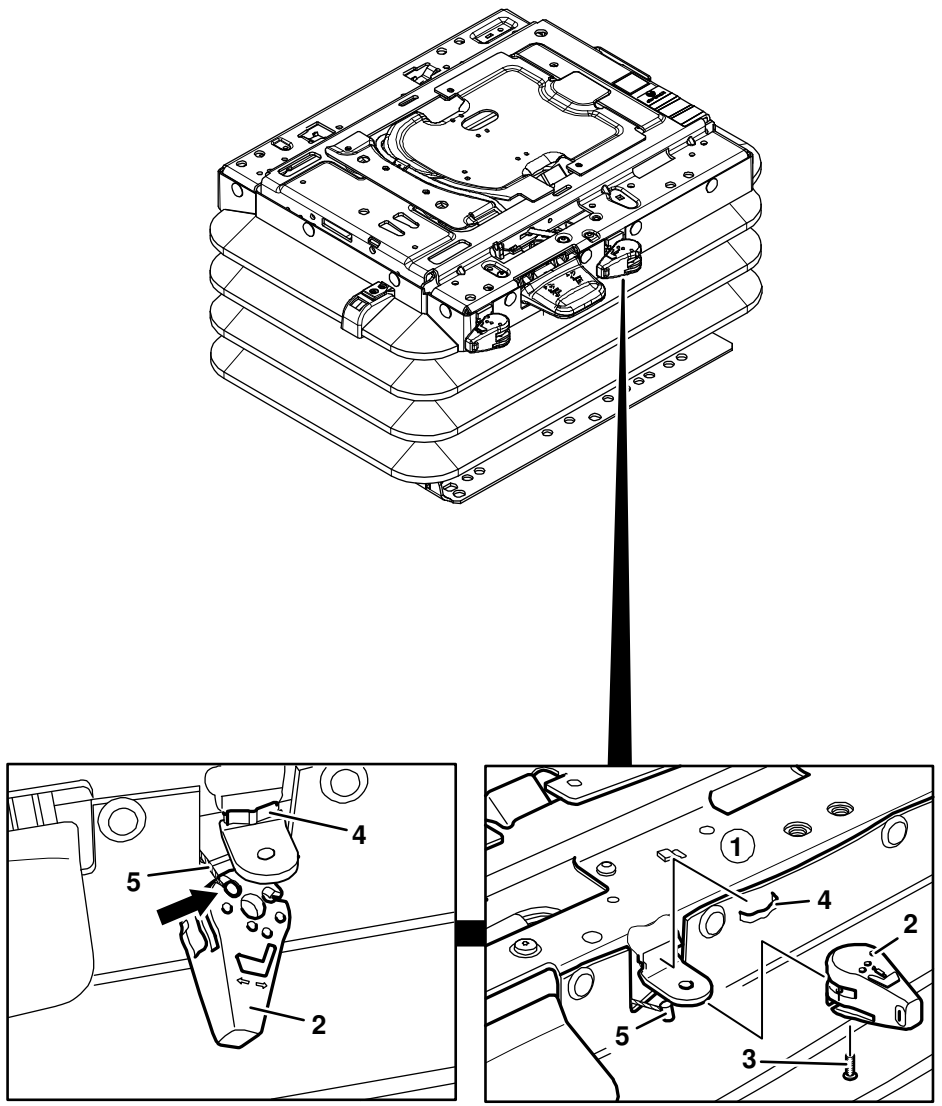
1 Unscrew the rounded head screw (3).
Installation note:
Rounded head screw (3), 2.25 Nm.

2 Pull off the handle (2) from the upper part of the suspension (1).
Installation note:
Apply acid-free multi-purpose lubricant to the upper suspension part (1) in the rotary motion area.

3 Take off the Bowden pull wire (5) at the handle (2).
Installation note:
Hang the nipple (arrow) at the Bowden pull wire (5) into the back eye at the handle (2). Ensure that the wire of the Bowden pull wire (5) runs in the groove of the handle (2).

4 Pull off the catch spring (4) at the upper suspension part (1).

5 Re-install the components in the reverse order of their removal.



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3.6 Bowden pull wire for vertical shock absorber adjustment – removal and installation (delivery option)

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3.6.1 Bowden pull wire for vertical shock absorber adjustment – removal and installation – with handle at the front

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Handle at the front:
Remove the front cover (Chapter 3.3).

3 Remove the top cover (Chapter 3.2).

4 Remove the bellows at the front of the upper suspension part (see Chapter 3.4) and press it down.

5 Remove the handle for vertical shock absorber adjustment (see Chapter 3.5).

6 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

7 Detach the Bowden pull wire (1) from the L-bar (9).

8 Press off the fixing (5) at the adjusting lever of the vertical shock absorber (6).

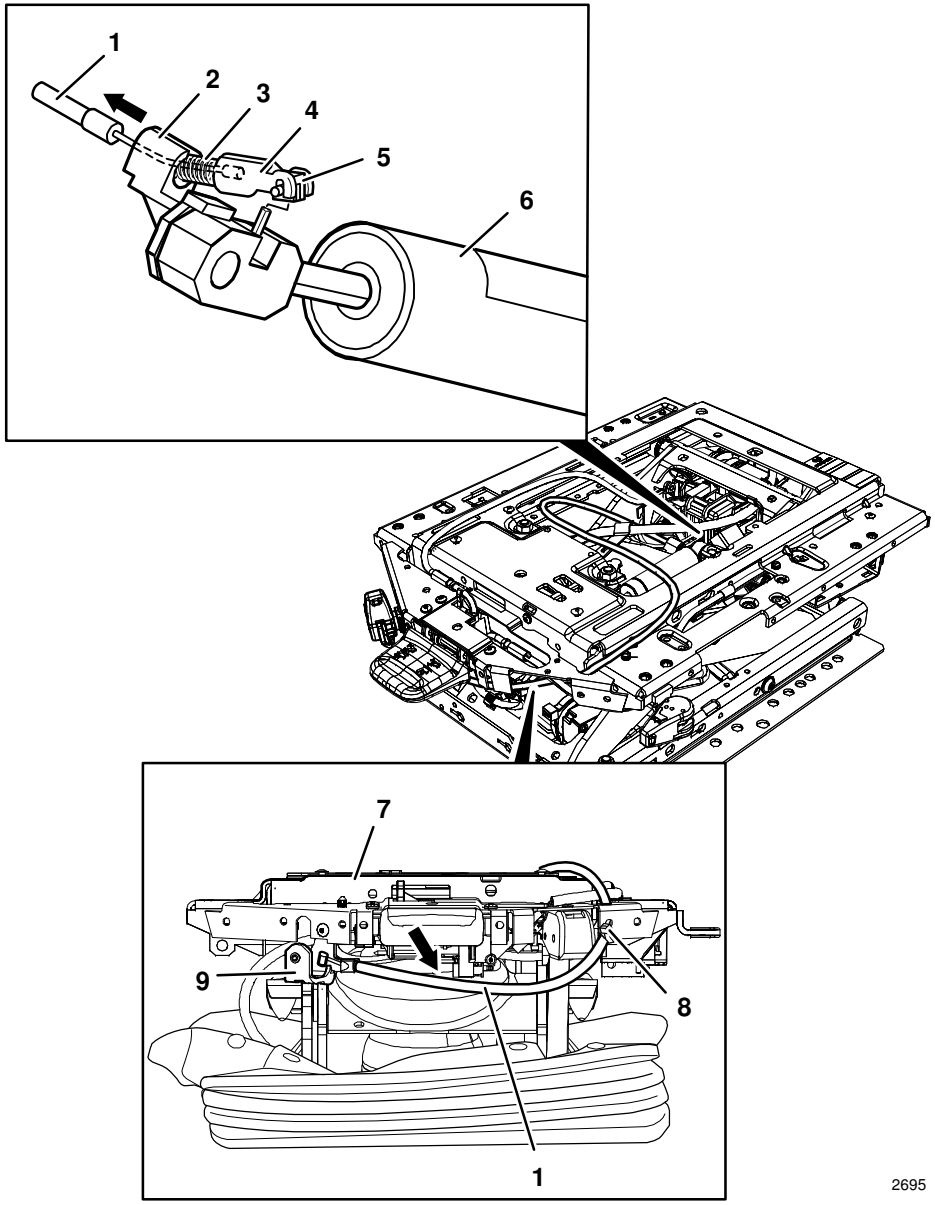
9 Compress the compression spring (3) (arrow direction) and take off the wire of the Bowden pull wire (1) at the bearing (2).

10 Detach the Bowden pull wire (1) at the fork (4) and remove the fork (4) and the compression spring (3).

11 Mark the point where the Bowden pull wire (1) is fastened at the upper seat suspension (7) with the cable tie (8) and remove the cable tie (8).

12 Mark the installation position of the Bowden pull wire (1) and remove the Bowden pull wire from the seat suspension in upward direction.
Installation notes:
• Install the Bowden pull wire (1) according to the marking.
• Bowden pull wire (1) must run at the front of the upper seat suspension (7) in front of the handle for height adjustment (arrow).
Seat suspension MSG95GL:
• Bowden pull wire (1) under the compressed-air hose for air spring – lay additional air supply.

13 Re-install the components in the reverse order of their removal.



3.6.2 Bowden pull wire for vertical shock absorber adjustment – removal and installation – with handle on the left

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Detach the bellows on the left of the upper suspension part (see Chapter 3.4) and press it down.

4 Remove the handle for vertical shock absorber adjustment (see Chapter 3.5).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 Detach the Bowden pull wire (1) from the support (9).

7 Press off the fixing (5) at the adjusting lever of the vertical shock absorber (6).

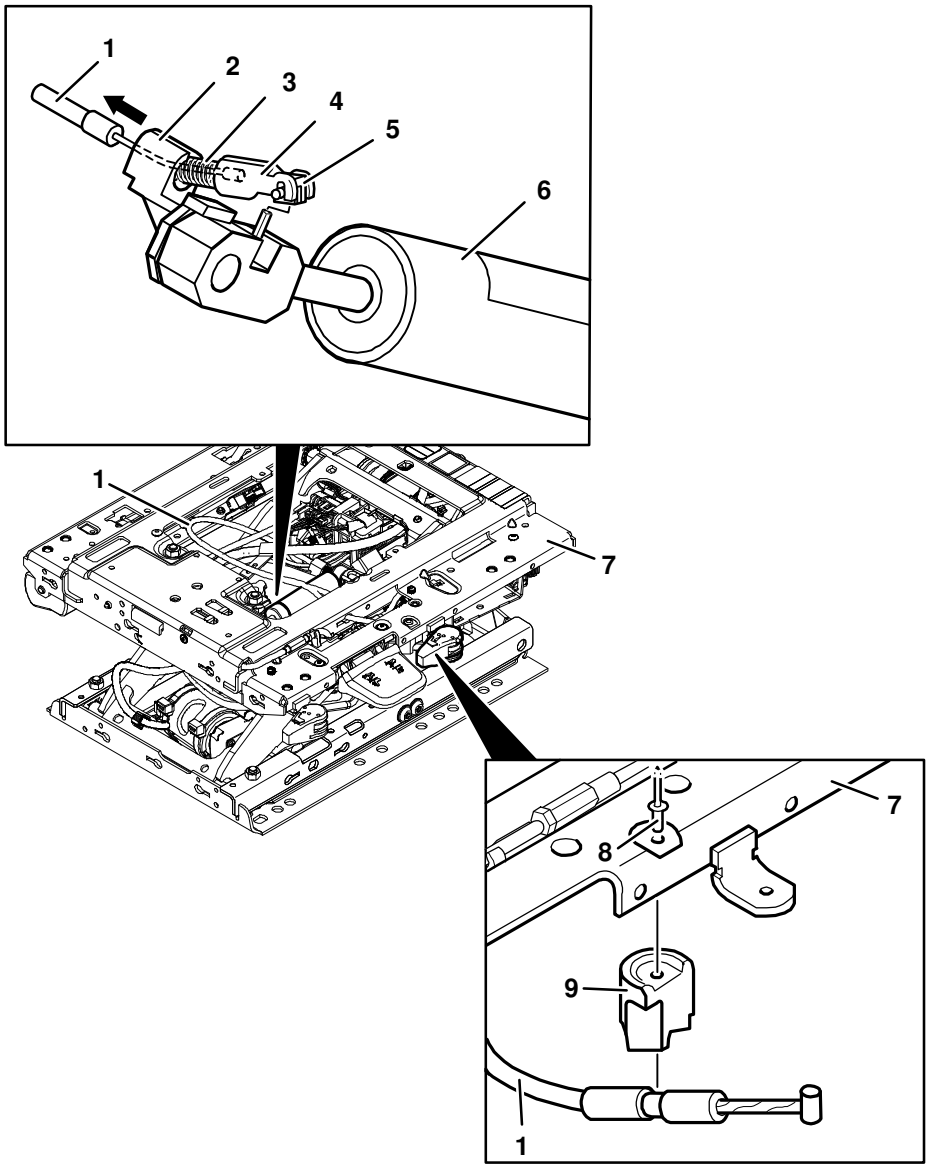
8 Compress the compression spring (3) (arrow direction) and take off the wire of the Bowden pull wire (1) at the bearing (2).

9 Detach the Bowden pull wire (1) at the fork (4) and remove the fork (4) and the compression spring (3).

10 Mark the installation position of the Bowden pull wire (1) and remove the Bowden pull wire from the seat suspension in upward direction.
Installation notes:
• Install the Bowden pull wire (1) according to the marking.
Seat suspension MSG95GL:
• Bowden pull wire (1) under the compressed-air hose for air spring – lay additional air supply.

11 If the support (9) is defective:
Bore out the rivet head and drive out the blind rivet (8). Pull off the handle (9) for the Bowden pull wire (1) from the upper part of the suspension (7).

12 Re-install the components in the reverse order of their removal.



3.7 Vertical shock absorber – removal and installation

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* Delivery option

3.7.1 Vertical shock absorber with bearing – removal and installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Remove the Bowden pull wire at the vertical shock absorber (3) (see Chapter 3.6).

4 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

5 Loosen the lock washer (2) at the stud (7).

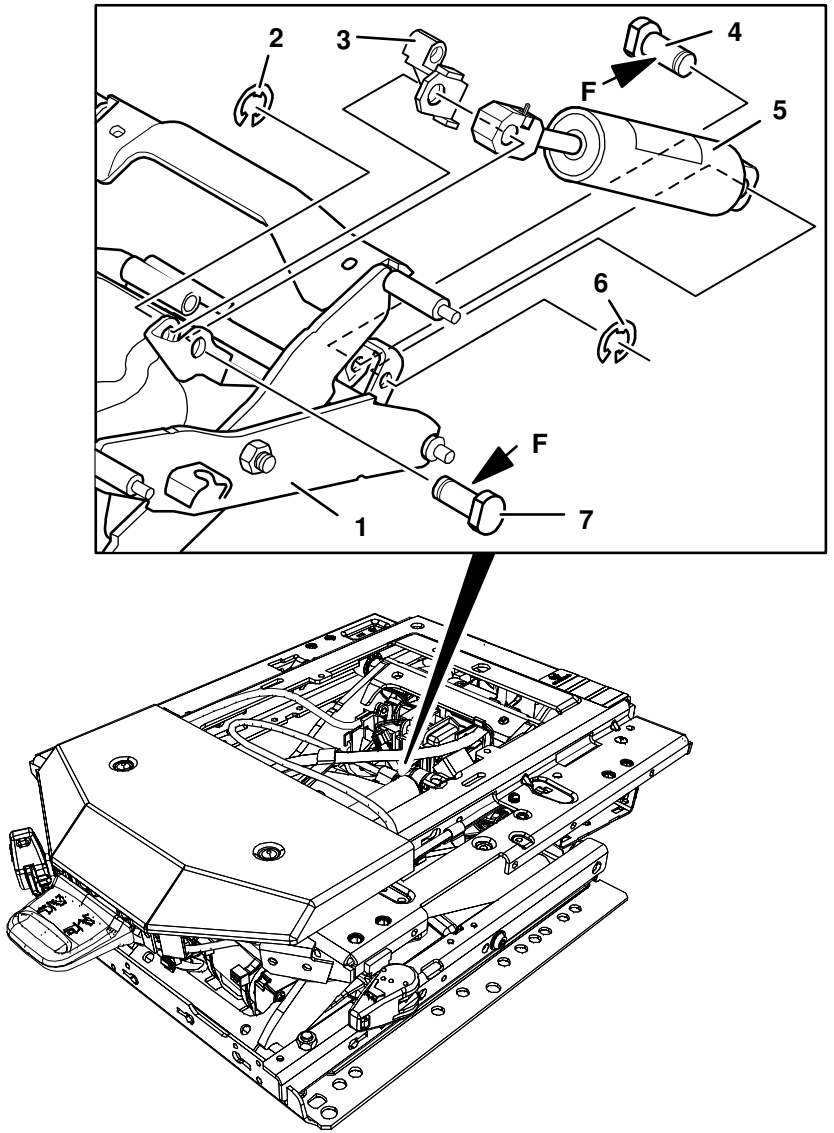
6 Remove the bolt (1) from the swinging structure, the vertical shock absorber (5) and the bearing (3).
Installation note:
Apply acid-free multi-purpose lubricant to the entire surface (F) of the hexagon bolt (7).

7 Loosen the lock washer (6) at the stud (4).

8 Remove the bolt (4) from the swinging structure (1) and the vertical shock absorber (5).
Installation note:
Apply acid-free multi-purpose lubricant to the entire surface (F) of the hexagon bolt (4).

9 Remove the vertical shock absorber (5) in upward direction and remove the bearing (3).
Installation note:
When re-installing the vertical shock absorber (5), make sure the labelling is on top.

10 Re-install the components in the reverse order of their removal.



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3.7.2 Non-adjustable vertical shock absorber –removal and installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Remove the bellows at the upper suspension part (see Chapter 3.4) and press it down.

4 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

5 Loosen the lock washer (5) at the stud (4).

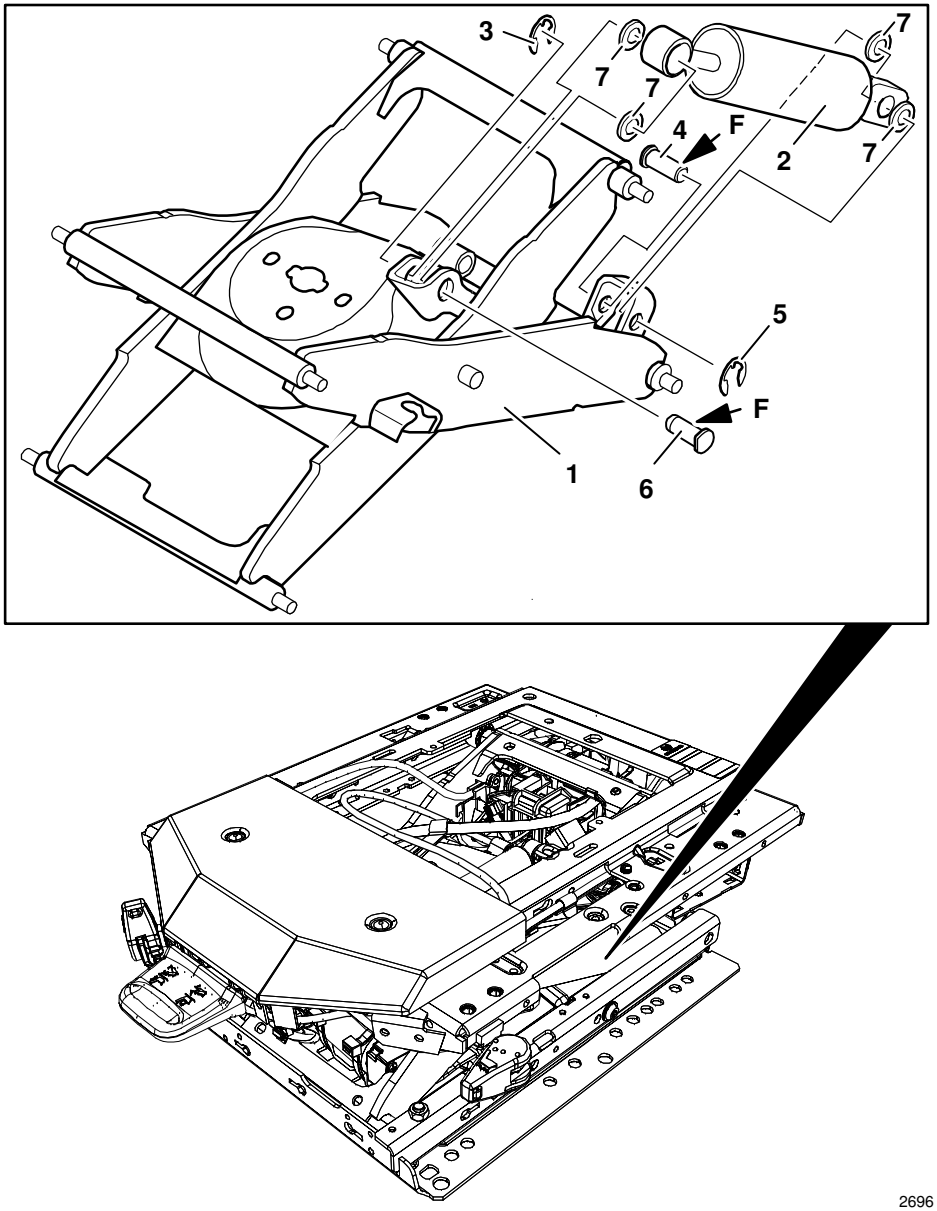
6 Pull out the stud (4) from the swinging structure (1) and the vertical shock absorber (2) and remove two washers (7).
Installation note:
Apply acid-free multi-purpose lubricant to the entire surface (F) of the hexagon bolt (4).

7 Loosen the lock washer (3) at the stud (6).

8 Pull out the stud (6) from the swinging structure (1) and the vertical shock absorber (2) and remove two washers (7).
Installation note:
Apply acid-free multi-purpose lubricant to the entire surface (F) of the hexagon bolt (6).

9 Remove the vertical shock absorber (2) in upward direction.
Installation note:
When re-installing the vertical shock absorber (2), make sure the labelling is on top.

10 Re-install the components in the reverse order of their removal.



3.8 Longitudinal horizontal shock absorber – removal and installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Handle at the front:
Remove the front cover (Chapter 3.3).

3 Remove the top cover (Chapter 3.2).

4 Remove the bellows from the front upper suspension part (see Chapter 3.4).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

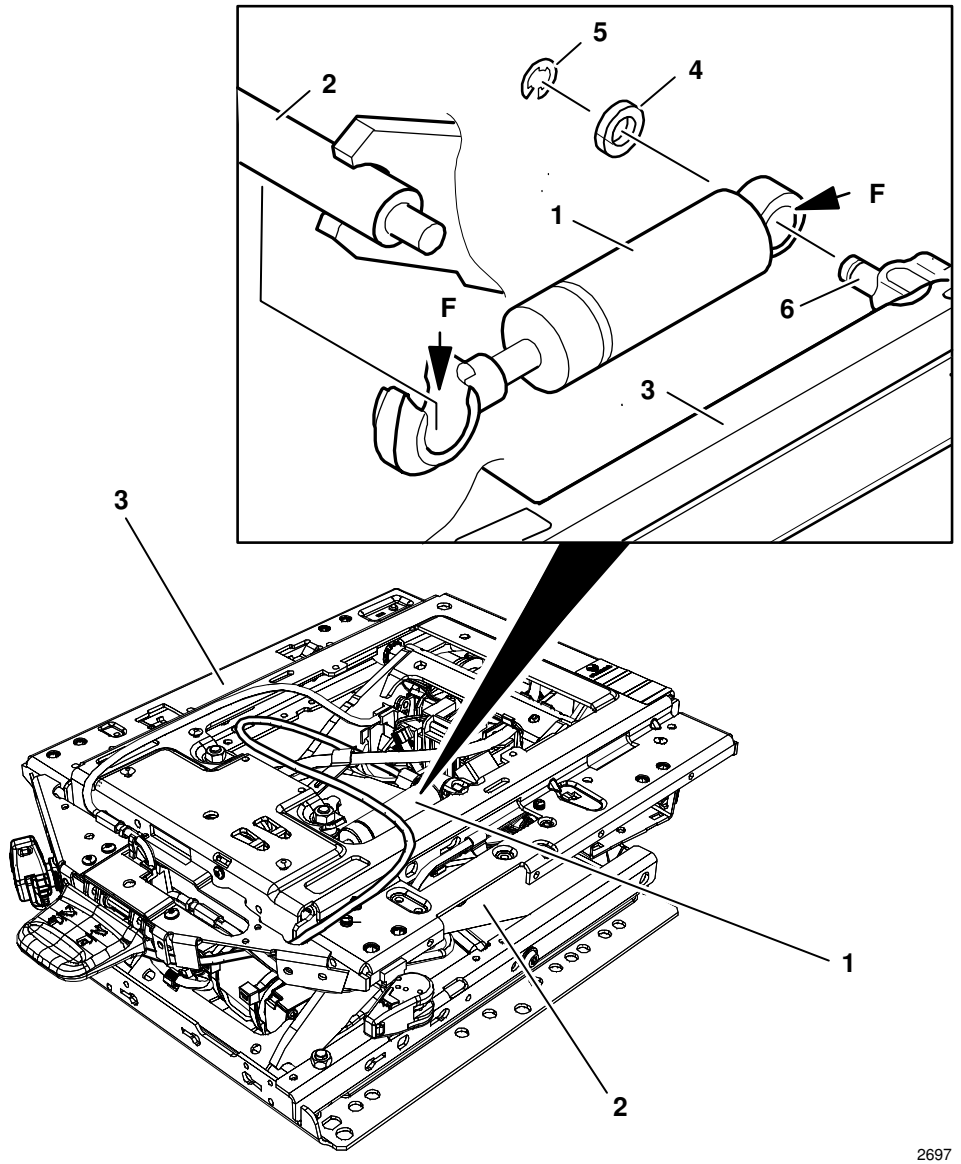
6 Lock the fore/aft isolator.

7 Lift off the longitudinal horizontal shock absorber (1) at the tube of the swinging structure (2).

8 Loosen the circlip (5) at the axle (6) and remove the washer (4).

9 Pull down the longitudinal horizontal shock absorber (1) at the axle (6) of the upper suspension part (3).
Installation notes:
• Apply acid-free multi-purpose lubricant to the mounting surfaces (F) of the longitudinal horizontal shock absorber (1).
• Press the longitudinal horizontal shock absorber (1) onto the tube of the swinging structure (2) without using driving or hammering tools.

10 Re-install the components in the reverse order of their removal.



3.9 Fore/aft isolator unit – removal /installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Handle at the front:
Remove the front cover (Chapter 3.3).

3 Remove the top cover (Chapter 3.2).

4 Remove the bellows from the front upper suspension part (see Chapter 3.4).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 If the Longitudinal horizontal shock absorber is defective:
Remove the longitudinal horizontal shock absorber (Chapter 3.9).

7 If the Longitudinal horizontal shock absorber is not defective:
Lever out the longitudinal horizontal shock absorber from the tube of the swinging structure (see Chapter 3.9).

8 Turn the handle of the fore/aft isolator (10) backwards to unlock the locking mechanism of the fore/aft isolator.

9 Undo the two collar screws (3).
Installation notes:
- Collar screw (3), 25 ± 5 Nm.
- During the installation, the tension spring (6) is screwed on under tension.
- Apply acid-free multi-purpose lubricant to the entire surface (F) of the collar screw (3).

10 Lift the upper suspension part (1) at the front off the swinging structure (2) (see Chapter 3.22), push it backwards and lay it down.

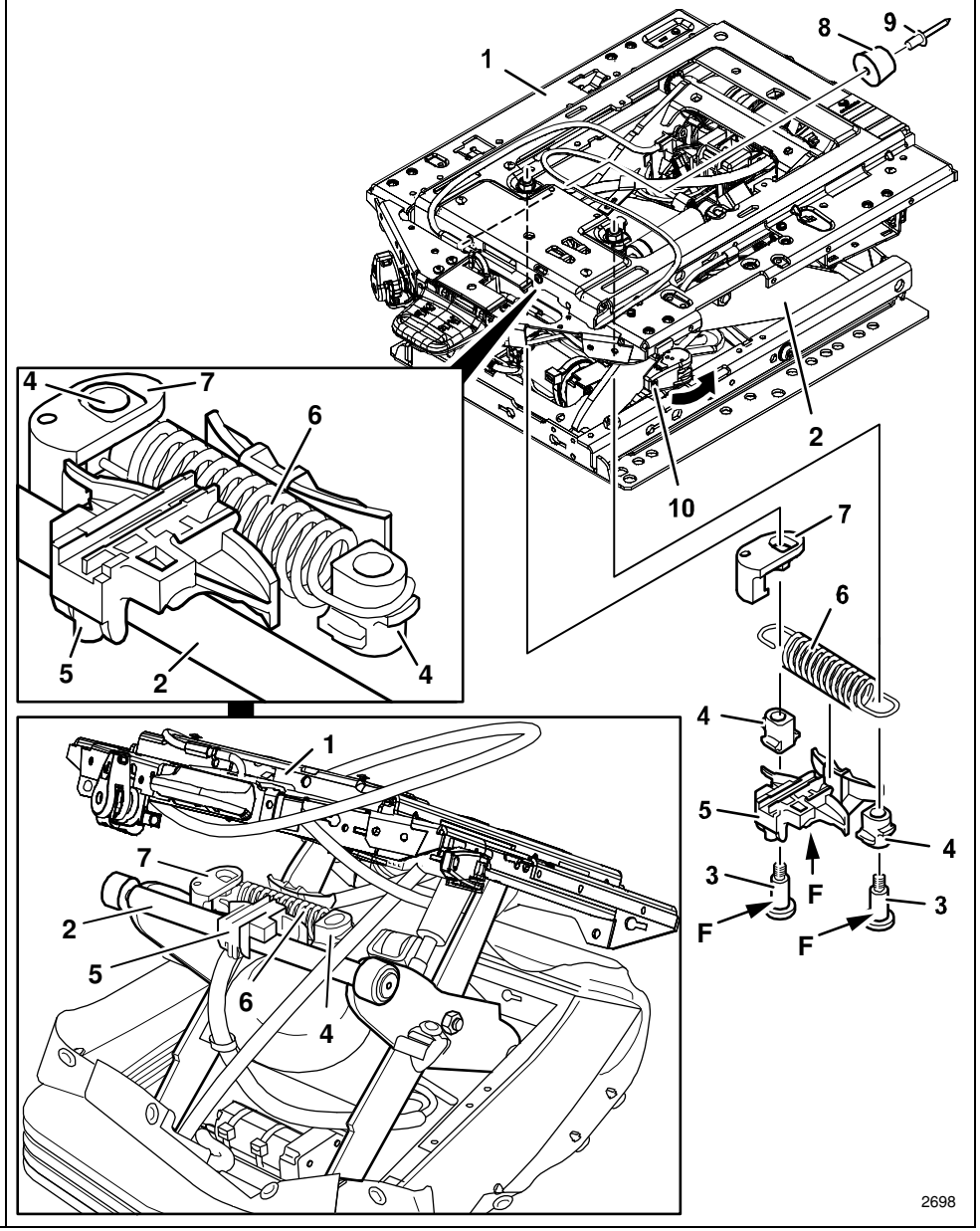
11 Press the clamp (5) off at the swinging structure (2).
Installation note:
Apply acid-free multi-purpose lubricant to the clamp (5) on the running surface (F) of the swinging structure.

12 Remove buffer (7) and two bushings (4) from the legs of the tension spring (6).

13 Remove the tension spring (6) from the clamp (5).

14 If the Buffer (8) is defective:
Drill off the rivet head and drive out the blind rivet (9), remove the buffer (8).

15 Re-install the components in the reverse order of their removal.



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3.10 Handle for fore/aft isolator – removal and installation (delivery option)

Removal and installation

1 Turn the handle for the fore/aft isolator (1) forwards.

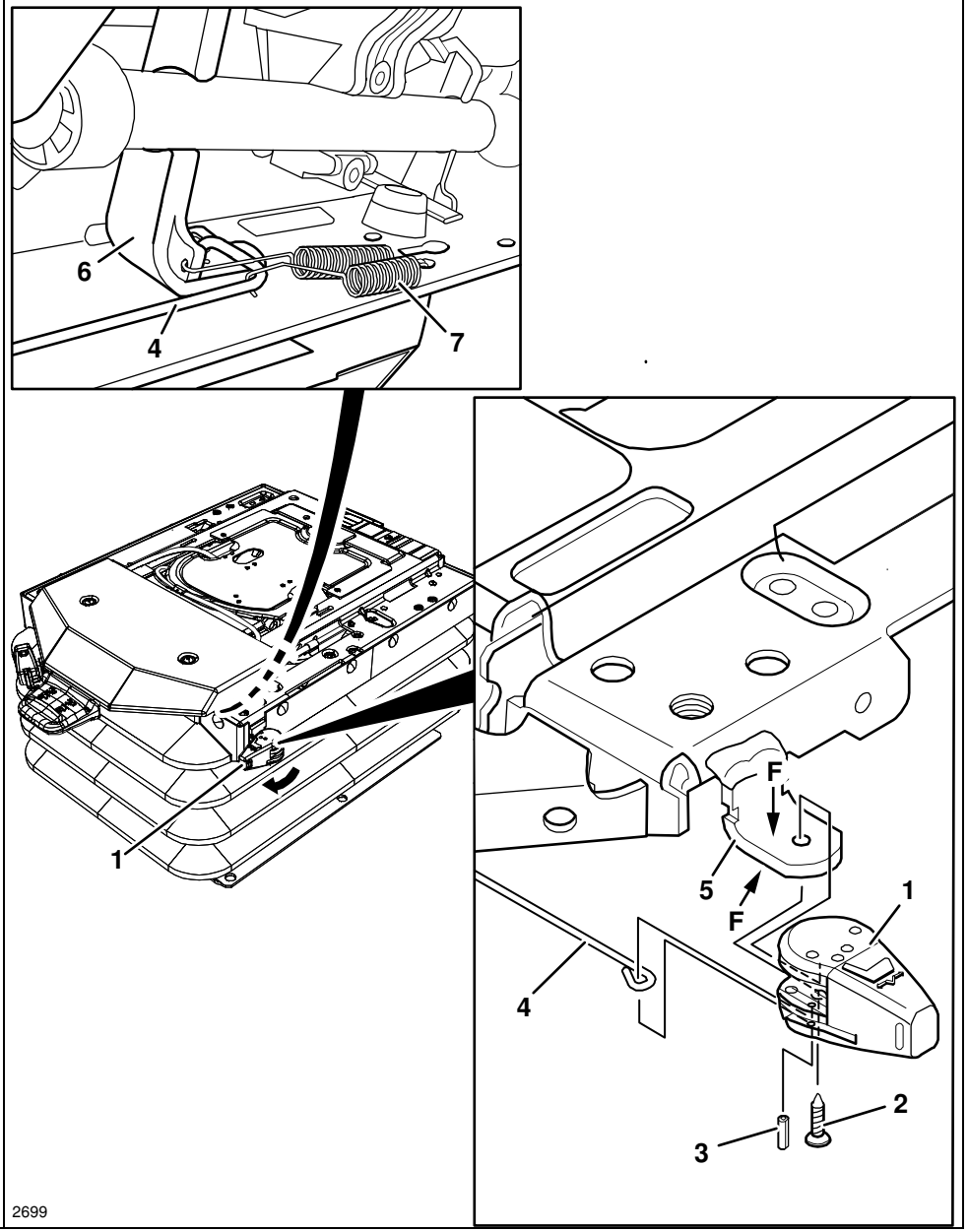
2 Unscrew the rounded head screw (2).
Installation note:
Rounded head screw (2), 2.5 Nm.

3 Mark the drill hole for the clamping sleeve (3) and drive out the clamping sleeve (3).
Installation note:
Install the clamping sleeve (3) according to the marking.

4 Carefully pull off the linkage rod (4) at the handle for the fore/aft isolator (1).
Note:
Make sure that the linkage rod (4) remains hung into the stop lever (6) and that the tension spring (7) remains hung into the linkage rod (5).

5 Remove the handle of the fore/aft isolator (1) at the L-bar (5).
Installation note:
Apply acid-free multi-purpose lubricant to the L-bar (5) in the rotary motion area (F).

6 Re-install the components in the reverse order of their removal.



3.11 Locking mechanism for fore/aft isolator – removal and installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension and put it aside (see Chapter 3.1).
Notes:
• Cable ties at cable harness for upper seat part need not be removed and the electrical connection need not be disconnected.
• Do not overstretch the cable harness for the upper seat part when putting it aside.

2 Handle at the front:
Remove the front cover (Chapter 3.3).

3 Detach the bellows at the front and on the left of the upper suspension part (see Chapter 3.4) and press it down.

4 Remove handle for the fore/aft isolator (Chapter 3.10).

5 ⚠ **WARNING!** Risk of crushing!
Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

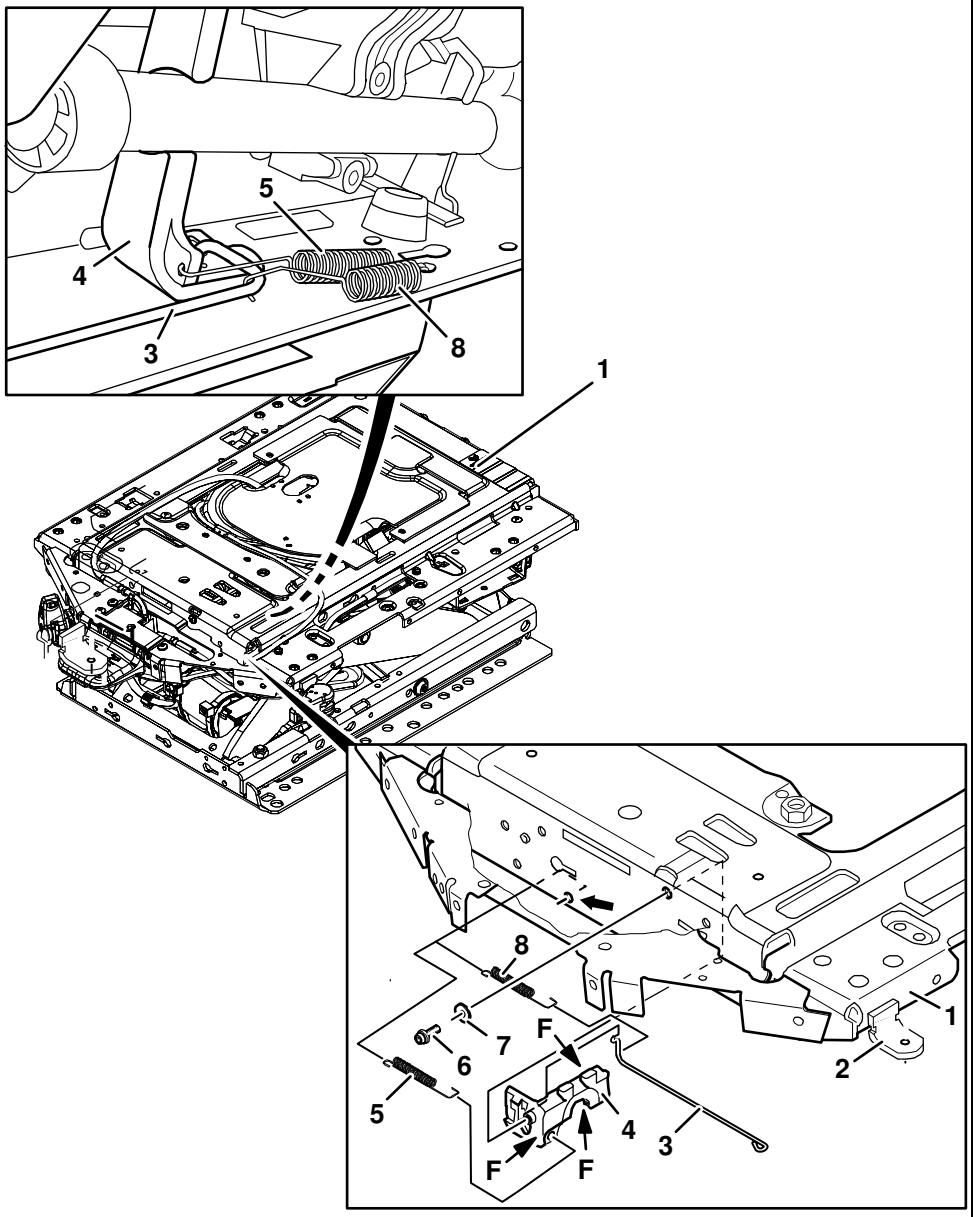
6 Mark the screw positioning diagram (arrows) for hanging in the tension springs (5, 7) and hang out the tension spring (7) at the upper suspension part (1) and the linkage rod (3).
Installation note:
Hang in the tension spring (7) according to the marking.

7 Hang out the linkage rod (3) at the stop lever (4).

8 Mark the screw positioning diagram (arrow) for hanging in the tension spring (5) and hang out the tension spring (5) at the upper suspension part (1) and the stop lever (4).
Installation note:
Hang in the tension spring (5) according to the marking.

9 Unscrew the collar screw (6) and remove it together with washer (7) and stop lever (4).
Installation notes:
• Collar screw (6), 2.5 ± 0.5 Nm.
• Apply acid-free multi-purpose lubricant to the side surfaces (F) of the stop lever (4).

10 Re-install the components in the reverse order of their removal.



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3.12 Compressor – removal and installation

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressor (1). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the bellows at the lower suspension part (see Chapter 3.4), push it upwards and fix it in this position.

2 ⚠ **WARNING!** Risk of crushing!

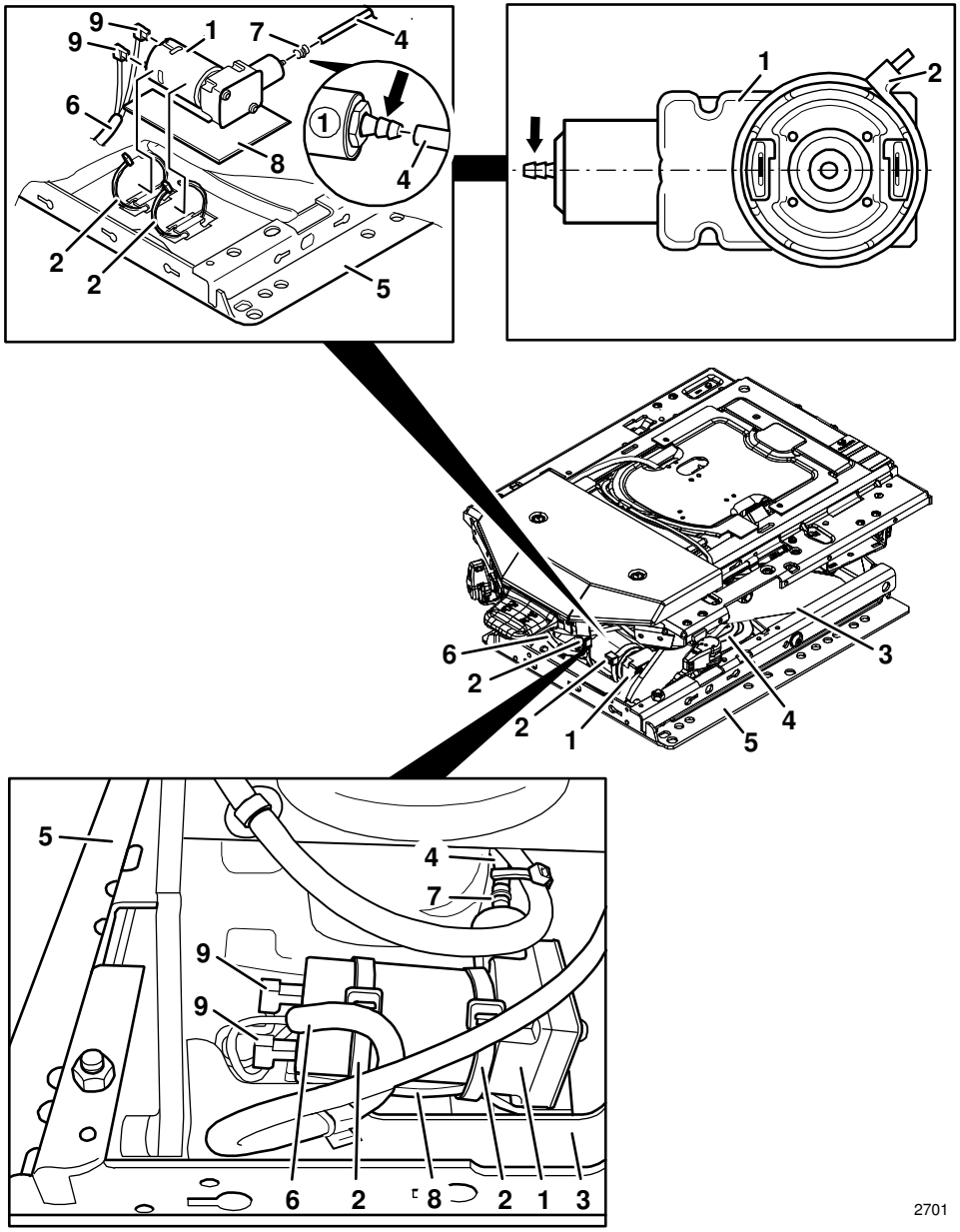
Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressor (1).

4 Mark and remove two right-angle plugs (9).
Installation notes:
• Reconnect the electrical connection according to the marking.
• When establishing the electrical connection, the cable output of the compressor cable (6) at the right-angle plug (9) must point downwards.

5 Mark the points where the compressor (1) is secured to the lower suspension part (5) with two cable ties (2) and remove the cable ties (2).
Installation notes:
• Run cable ties (2) through the corresponding cut-outs in the lower part of suspension (5) in such a way that the locking head of cable ties (2) points forwards.
• Loosely close the cable ties (2) in such a way that the compressor (1) can still be moved.
• Align the compressor (1) so a collision with the swinging structure (3) is avoided and then use pliers to tighten the locking head of the cable ties (2) to 360 ± 30 N in the direction shown (arrow).



3.12 Compressor – removal and installation

6 Pull off the hose nozzle (7) at the connection (arrow) of the compressor (1) and push it backwards at the compressed-air hose (4).

7 ⚠ **ATTENTION** Do not damage the connection (arrow) at the compressor (1)!

- Do not use a screwdriver or similar tools to lift off the compressed-air hose (4) at the connection (arrow) of the compressor (1).
- Repair works must be performed with the GRAMMER special tool kit Praticco.

8 Cut off the compressed-air hose (4) with a sharp knife in a clean and straight way directly behind the connection (arrow) of the compressor (1).

Notes:

- The compressed-air hose (4) can be cut off only once.
- After cutting off, mark the compressed-air hose (4) in order not to cut it several times.

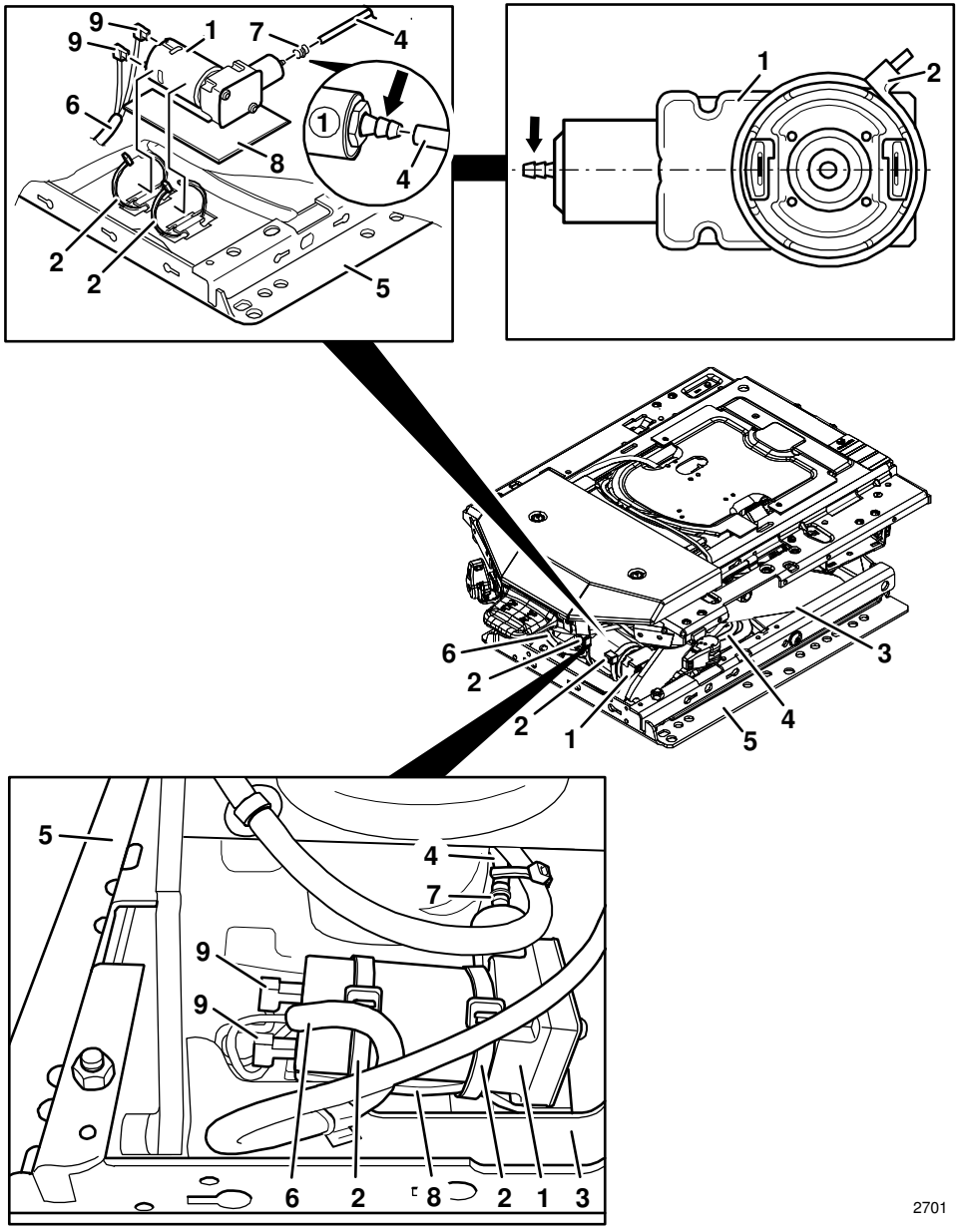
Installation note:
Push the compressed-air hose (4) completely onto the connection (arrow) of the compressor (1).

9 Pull off the nozzle (7) at the compressed-air hose (4).

10 Remove the compressor (1) in forward direction and remove the rest of the hose at the connection (arrow).

11 Remove the washer (8) from the lower suspension part (3).
Installation note:
Place the pad (8) between the lower part of suspension (5) and the compressor (1) in such a way that the compressor (1) cannot get into contact with the lower part of suspension (5).

12 Re-install the components in the reverse order of their removal.



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3.13 Secondary belt – removal and installation (delivery option)

Removal and installation

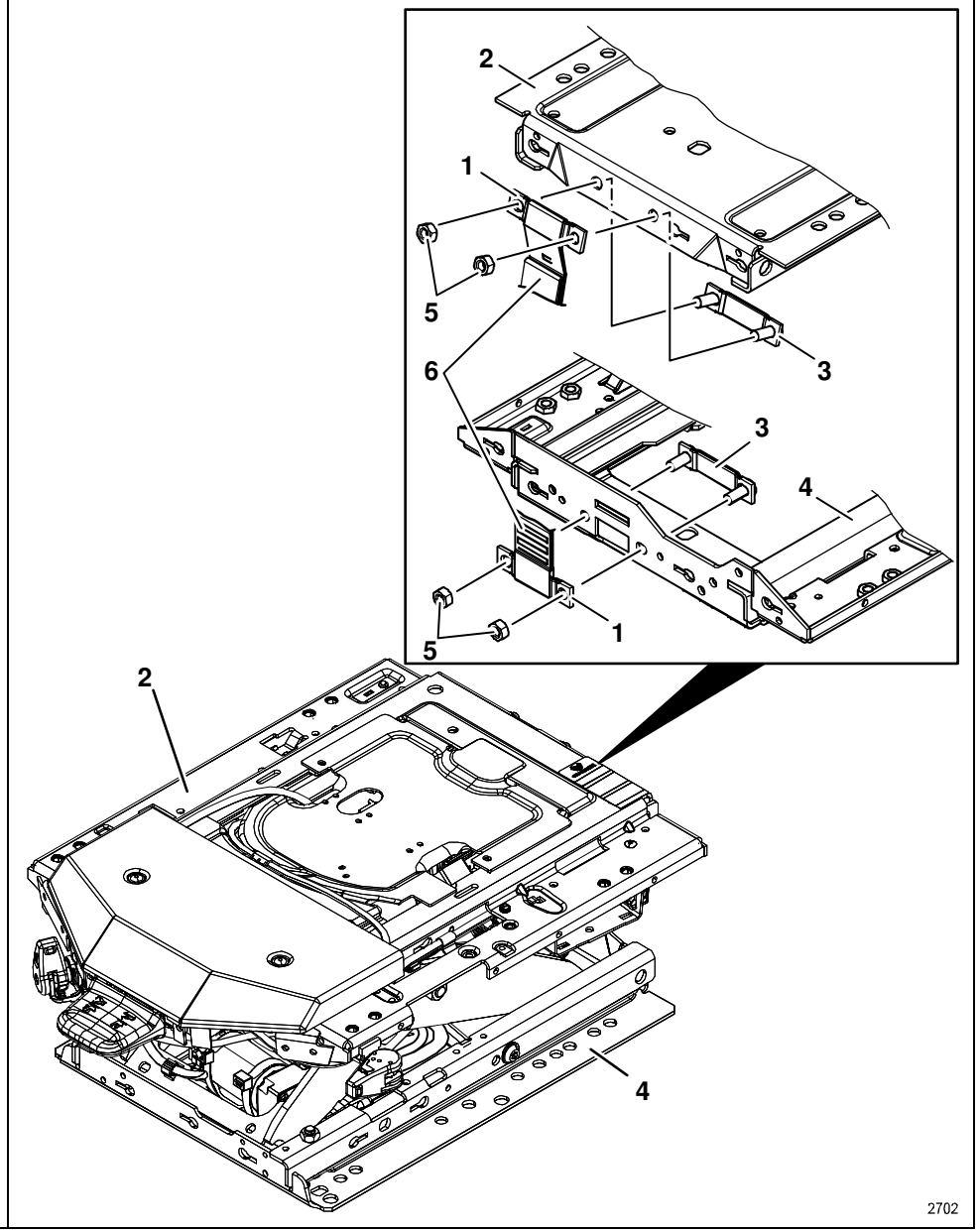
1 Remove the bellows at the back of the upper suspension part and the lower suspension part (see Chapter 3.4).

2 Unscrew four hexagon nuts (5).
Installation notes:
• Replace the hexagon nut (5) by a new one, 25 ± 5 Nm.
• Make sure not to squeeze the secondary belt (6) when tightening the hexagon nuts (5).

3 Pull off the plates (1) from the threaded bolts of the plates (3) and remove it together with the secondary belt (6).
Installation note:
The bend of the plates (1) must point to the outside.

4 Pull off the plates (1) from the secondary belt (6) and remove plates (3) from the upper part (2) and lower part (4) of the suspension.
Installation note:
The overlapping seams at the secondary belt (6) must be located on top and point inward.

5 Re-install the components in the reverse order of their removal.



3.14 Level indicator – removal and installation

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* Delivery option

3.14.1 Level indicator – removal and installation – with handle at the front (delivery option)

Removal and installation

1 Remove the front cover (Chapter 3.3).

2 Remove the bellows at the front of the upper and lower suspension part (see Chapter 3.4).

3 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

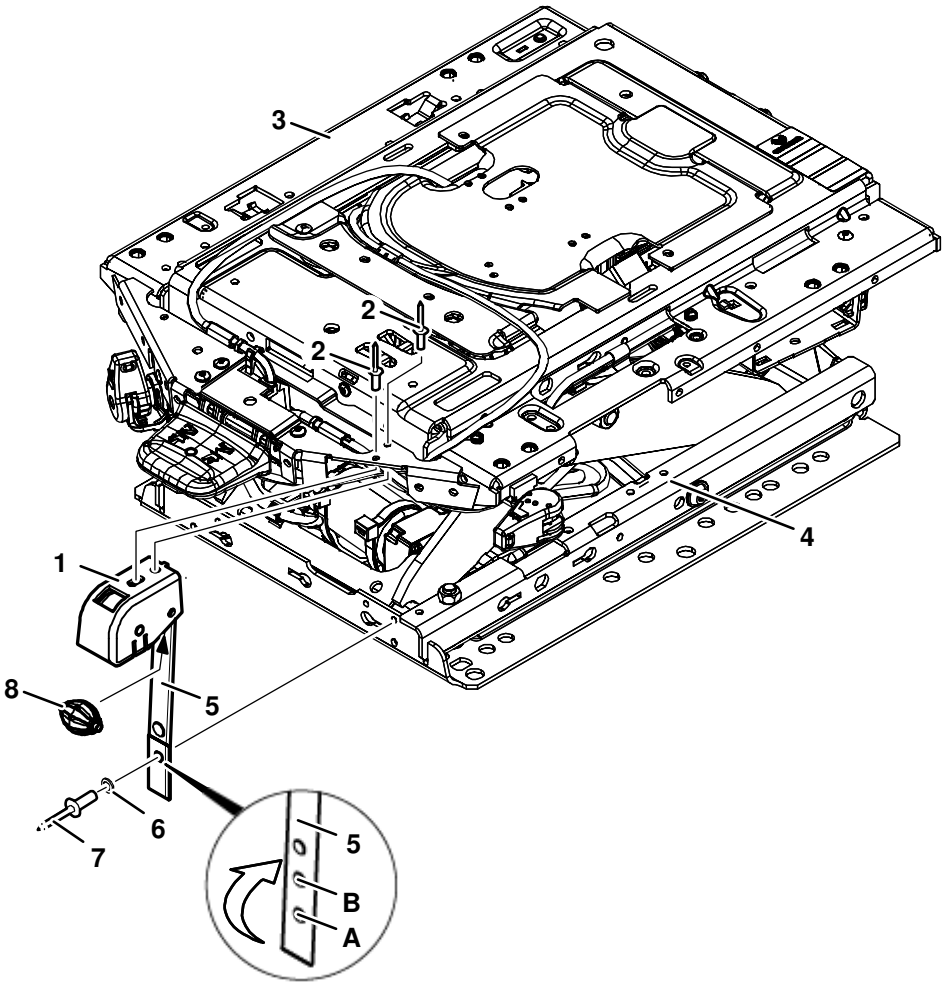
4 Bore off two rivet heads and drive out the blind rivet (2) from the top part of the suspension (3).

5 Put level display (1) aside.
Note:
Indicator ribbon (5) is pulled inwards into the casing of the level indicator (1) by spring tension.

6 Drill off the rivet head, drive out the blind rivet (7) and remove the washer (6).
Installation note:
• Turn back (arrow) the indicator ribbon (5) and push the blind rivet (7) with washer (6) through drill hole (A) and (B).
• Rivet the indicator ribbon (5) tight at the outer left drill hole in the lower suspension part (4).

7 **If the plastic roller (8) is defective:**
Release the plastic roller (8) in the casing of the level indicator (1).

8 Re-install the components in the reverse order of their removal.



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3.14.2 Level indicator with L-bar – removal and installation – with handle on the left (delivery option)

Removal and installation

1 Remove the bellows at the front of the upper and lower suspension part (see Chapter 3.4).

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 Bore off two rivet heads and drive out the blind rivet (3) from the top part of the suspension (4).

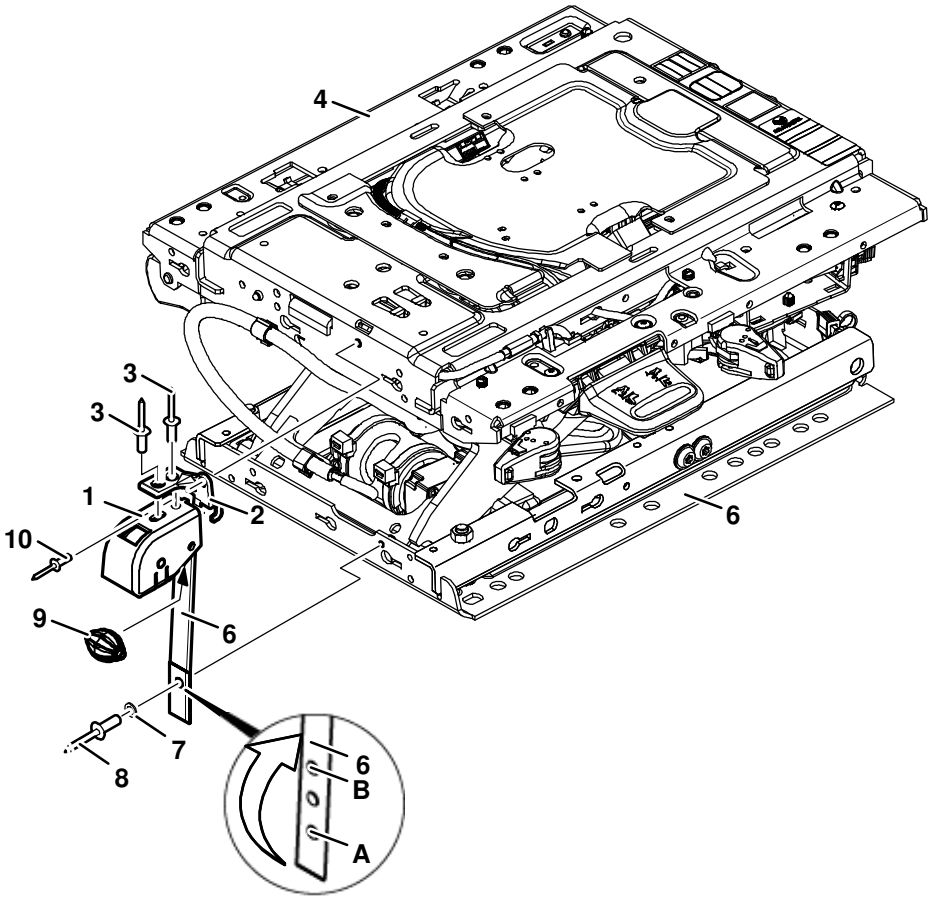
4 Put level display (1) aside.
Note:
Indicator ribbon (6) is pulled inwards into the casing of the level indicator (1) by spring tension.

5 Drill off the rivet head, drive out the blind rivet (8) and remove the washer (7).
Installation note:
• Turn back (arrow) the indicator ribbon (6) and push the blind rivet (8) with washer (7) through drill hole (A) and (B).
• Rivet the indicator ribbon (6) tight at the second, top drill hole in the lower suspension part (5).

6 **If the L-bar (2) is defective:**
Drill off the rivet head, drive out the blind rivet (10) and remove the L-bar (2).

7 **If the plastic roller (9) is defective:**
Release the plastic roller (9) in the casing of the level indicator (1).

8 Re-install the components in the reverse order of their removal.



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3.15 Compressed-air hose – removal and installation

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* Delivery option

3.15.1 Compressed air hose between compressor and air spring removal and installation

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the bellows at the lower suspension part (see Chapter 3.4), push it upwards and fix it in this position.

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

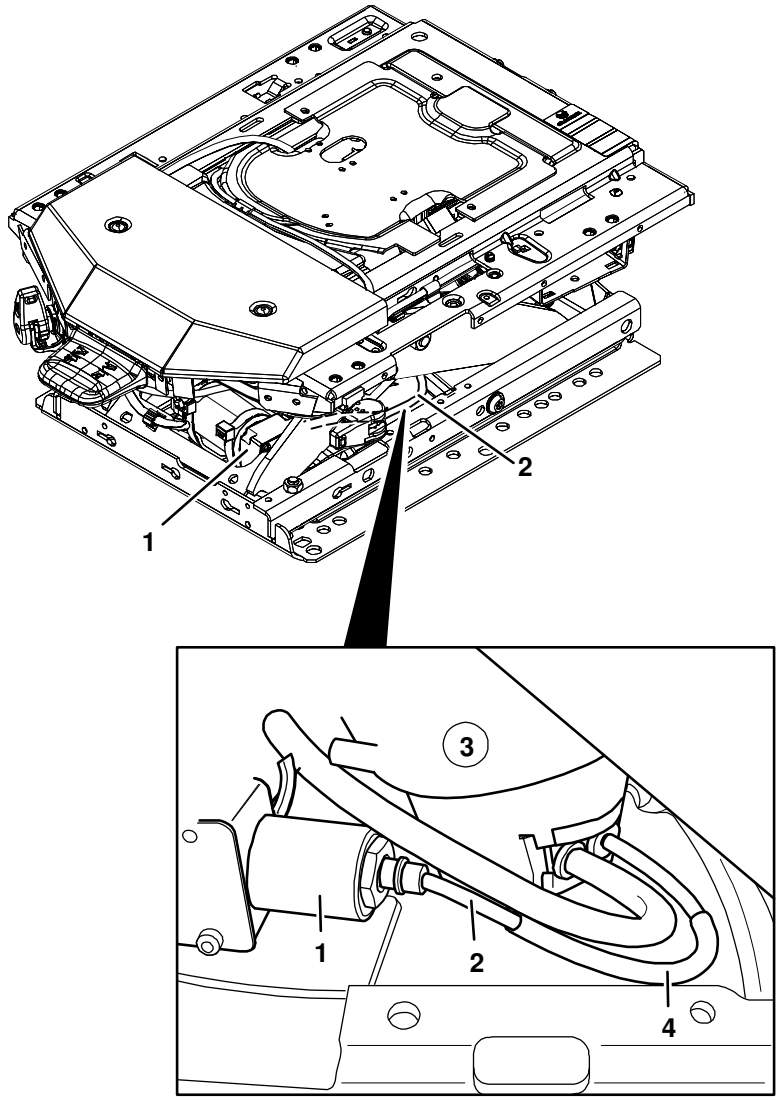
The pneumatic system is to be vented before removing the compressed-air hose (2).

4 Remove the compressed air hose (2) from the compressor (1) (see Chapter 3.12).

5 Remove the compressed air hose (2) from the air spring (3) (see Chapter 3.16).

6 Pull off the protective hose (8) from the compressed-air hose (2).

7 Re-install the components in the reverse order of their removal.



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3.15.2 Compressed air hose between air spring and valve for height adjustment removal and installation – seat suspension MSG95G with handle at the front (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the bellows (Chapter 3.4).

3 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

4 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

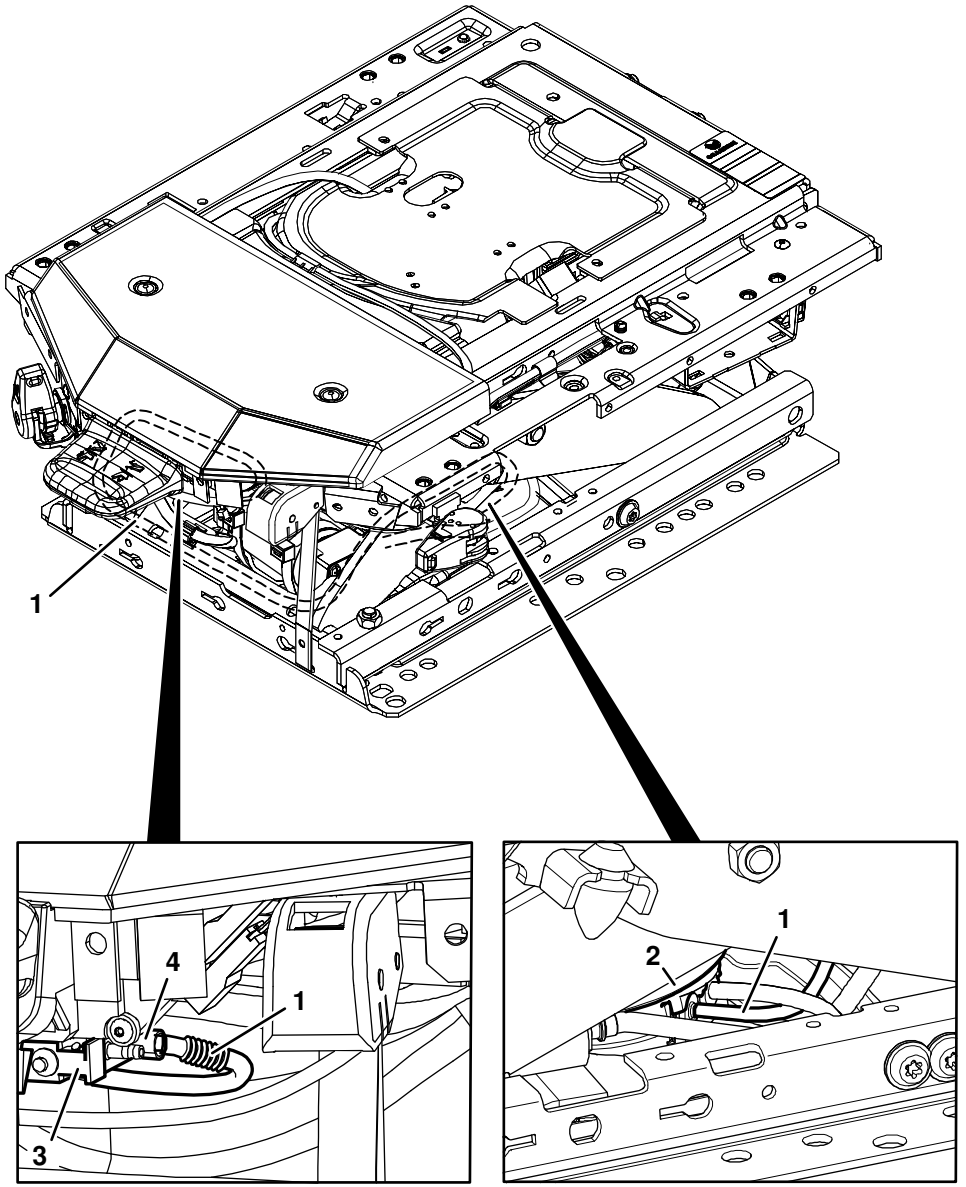
5 Mark the points where the compressed-air hose (1) is secured with the cable clamps, and remove the cable clamps.

6 Remove the compressed-air hose (1) from the air spring (2) (see Chapter 3.16).

7 Remove the compressed-air hose (1) from the height adjustment valve (3) (see Chapter 3.18).

8 Mark the installation position of the compressed-air hose (1) and remove the compressed-air hose from the seat suspension in upward direction.
Installation notes:
• Install the compressed-air hose (1) according to the marking.

9 Re-install the components in the reverse order of their removal.



3.15.3 Compressed air hose (with cable harness) between air spring and valve for height adjustment removal and installation – seat suspension MSG95G with handle on the left (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the bellows (Chapter 3.4).

3 Remove the cable harness for vehicle connection (Chapter 3.20).

4 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

5 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

6 Mark the points where the compressed-air hose and cable harness (1) is secured with the cable clamps (5) and remove the cable clamps.

7 Detach the compressed-air hose (1) from the L-bar (6).

8 Remove the compressed air hose (1) from the air spring (2) (see Chapter 3.16).

9 Remove the right-angle plug from the compressor (4) (see Chapter 3.12).

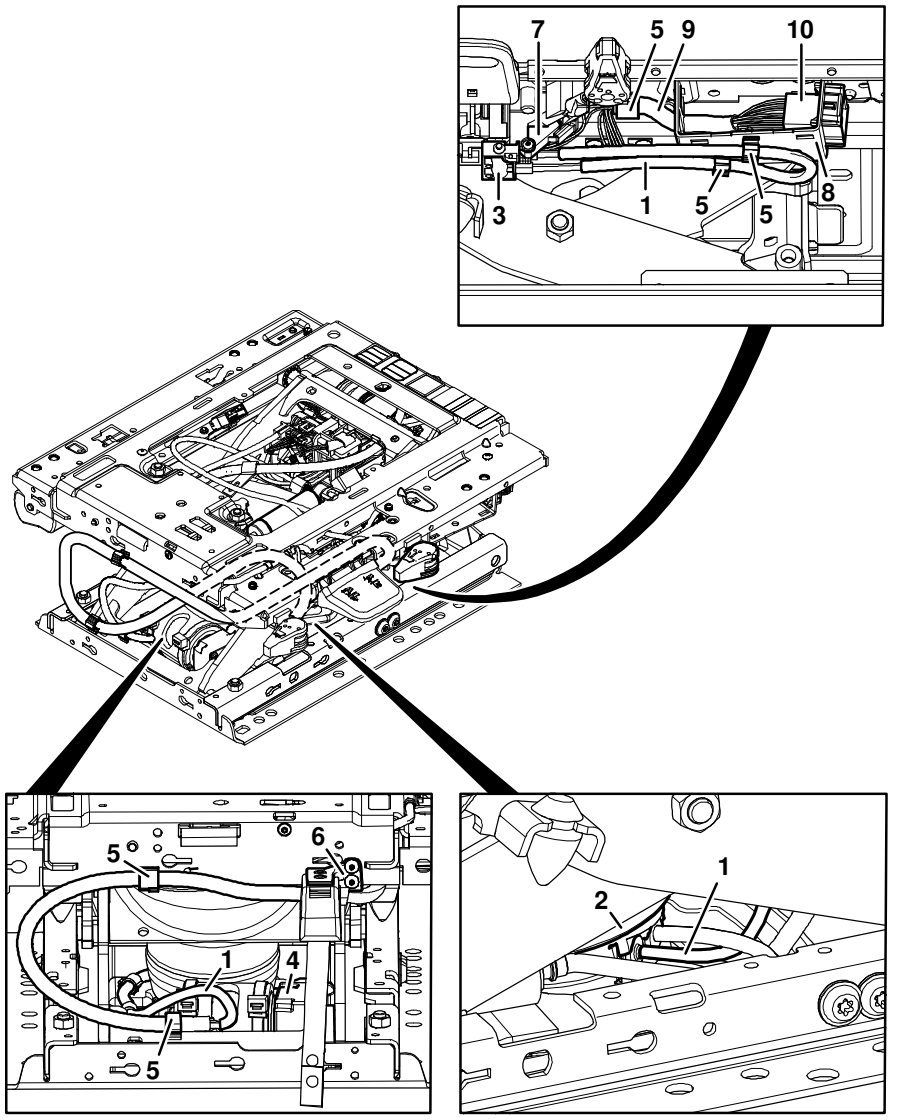
10 Remove the compressed-air hose (1) from the height adjustment valve (3) (see Chapter 3.19).

11 Disconnect the electrical connection at the micro-switch (3) (see Chapter 3.19).

12 Release the plug (10) at the U-profile (8).

13 Remove the plug (11) (see Chapter 3.21.2).

14 Mark the points where the cable harness for the seat suspension (9) is secured with the cable clamps (5) and remove the cable clamps.



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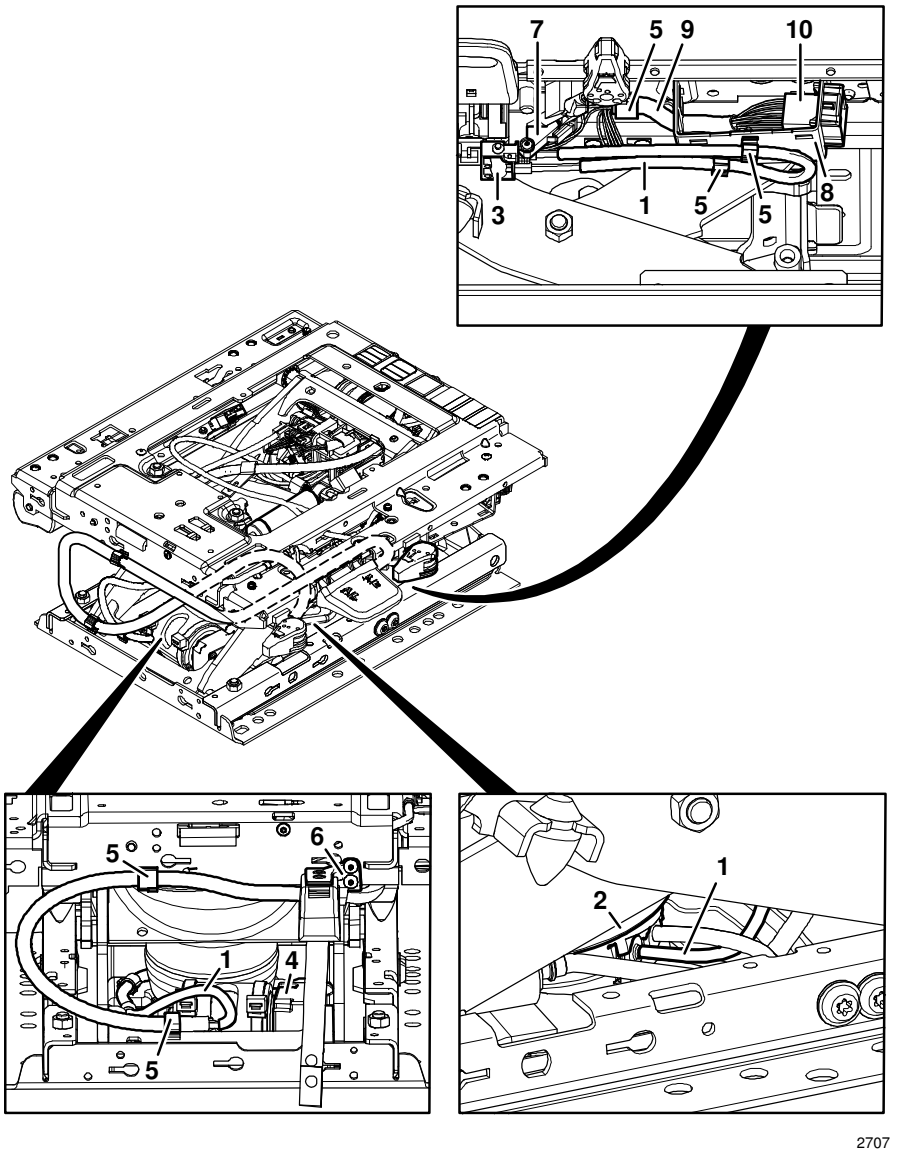
3.15.3 Compressed air hose (with cable harness) between air spring and valve for height adjustment removal and installation – seat suspension MSG95G with handle on the left (delivery option)

15 Mark the installation position of the compressed-air hose (1) and cable harness for seat suspension (9) and remove the compressed-air hose with cable harness from the seat suspension.
Installation note:
Install the compressed-air hose and cable harness (1) seat suspension (9) according to the marking.

16 Re-install the components in the reverse order of their removal.



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3.15.4 Compressed air hose between air spring and additional air supply removal and installation (seat suspension MSG95GL)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the bellows (Chapter 3.4).

3 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

4 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

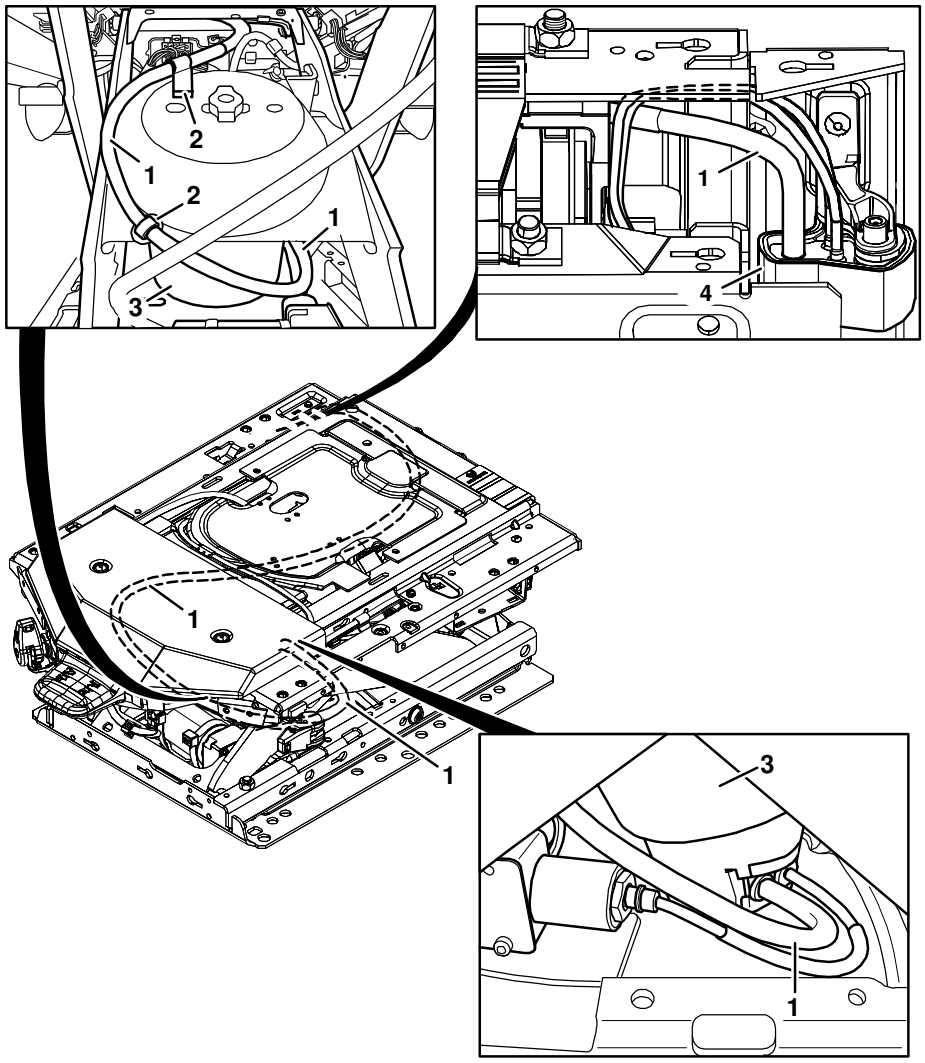
5 Mark the points where the compressed-air hose (1) is secured with the cable clamps, and remove the cable clamps.

6 Remove the compressed air hose (1) from the air spring (3) (see Chapter 3.16).

7 Remove the compressed-air hose (1) from the additional air supply (4) (see Chapter 3.17).

8 Mark the installation position of the compressed-air hose (1) and remove the compressed-air hose from the seat suspension in upward direction.
Installation notes:
• Install the compressed-air hose (1) according to the marking.

9 Re-install the components in the reverse order of their removal.



3.15.5 Compressed air hose between additional air supply and valve for height adjustment removal and installation – seat suspension MSG95GL with handle at front (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the bellows at the upper suspension part (see Chapter 3.4) and press it down.

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

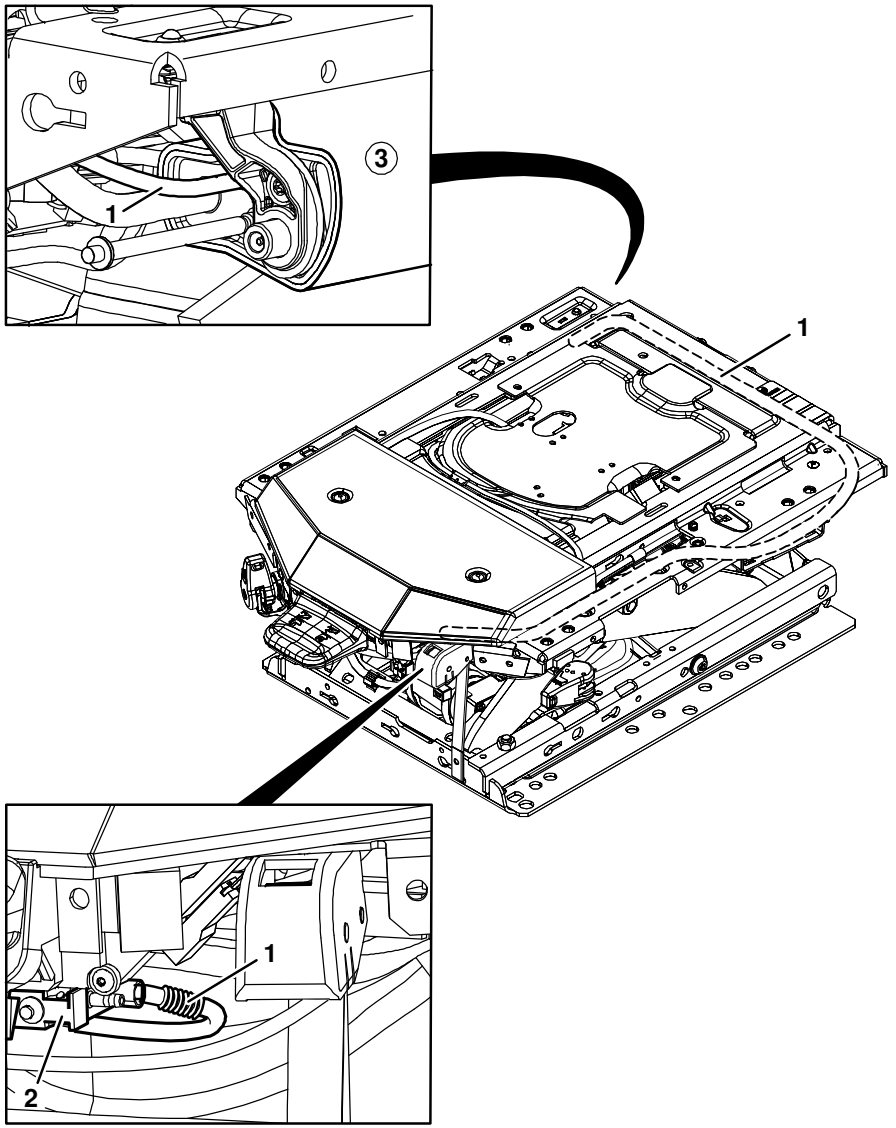
4 Mark the points where the compressed-air hose (1) is secured with the cable clamps, and remove the cable clamps.

5 Remove the compressed-air hose (1) from the additional air supply (3) (see Chapter 3.17).

6 Remove the compressed-air hose (1) from the height adjustment valve (2) (see Chapter 3.19).

7 Mark the installation position of the compressed-air hose (1) and remove the compressed-air hose from the seat suspension in upward direction.
Installation notes:
• Install the compressed-air hose (1) according to the marking.

8 Re-install the components in the reverse order of their removal.



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3.15.6 Compressed air hose between additional air supply and valve for height adjustment removal and installation – seat suspension MSG95GL with handle on the left (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the bellows at the upper suspension part (see Chapter 3.4) and press it down.

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

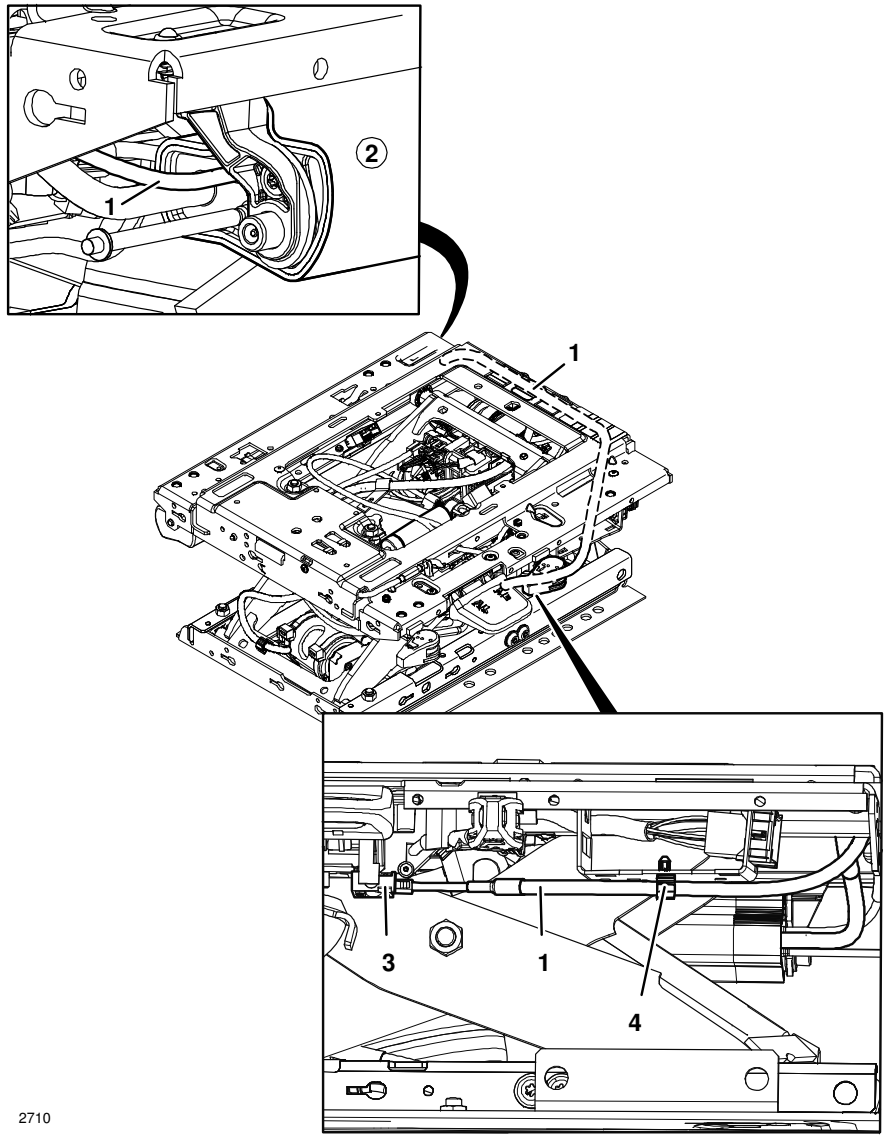
4 Mark the points where the compressed-air hose (1) is secured with the cable clamps (4), and remove the cable clamps.

5 Remove the compressed-air hose (1) from the additional air supply (2) (see Chapter 3.17).

6 Remove the compressed-air hose (1) from the height adjustment valve (3) (see Chapter 3.19).

7 Mark the installation position of the compressed-air hose (1) and remove the compressed-air hose from the seat suspension in upward direction.
Installation note:
Install the compressed-air hose (1) according to the marking.

8 Re-install the components in the reverse order of their removal.



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3.16 Air spring – removal and installation

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the air spring (2). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the bellows at the upper suspension part (see Chapter 3.4) and press it down.

3 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

4 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

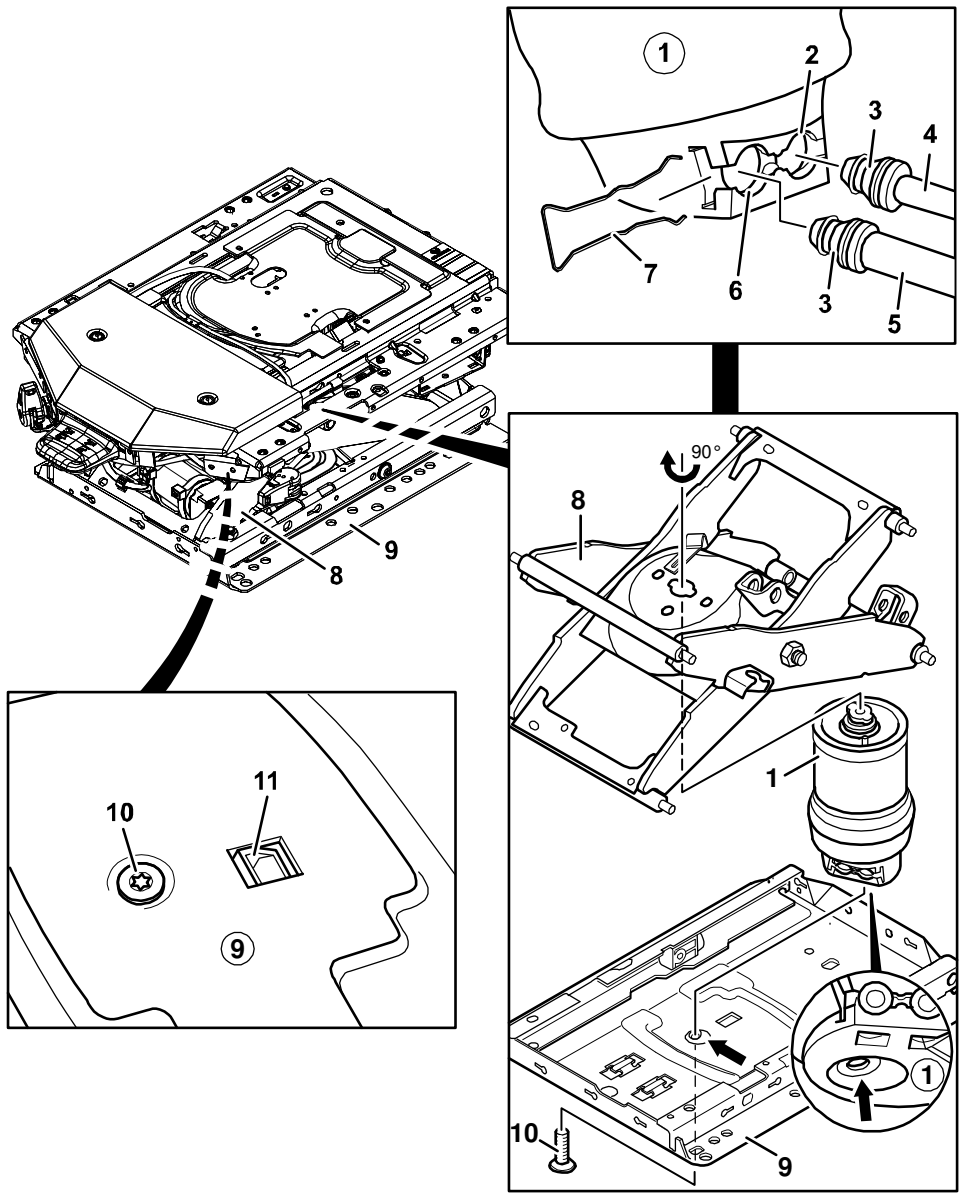
The pneumatic system is to be vented before removing the air spring (1).

5 Pull the catch spring (7) out of the air spring (1).

6 Pull the quick couplings (3) of the compressed-air hoses (4, 5) out of the air spring (1).
Installation notes:
• First, plug the catch spring (7) into the air spring (1) and then plug the quick couplings (3) into the air spring (1) with an audible click.
• Connection at the back (2): Compressed-air hose for compressor – air spring (4).
• Connection at the front (6):
Seat suspension MSG95G: Compressed-air hose for air spring – valve for height adjustment (5).
Seat suspension MSG95GL: Compressed-air hose for air spring – additional air supply (5).

7 Undo the countersunk screw (10) from the air spring (1).
Installation notes:
• Countersunk screw (10), 6 Nm.
• The internal thread collar (arrow) at the bottom of the air spring (1) must lie flush in the drill hole (arrow) of the lower suspension part (9).

8 Turn the air spring (1) by 90° until the bayonet catch fits through the longitudinal hole in the swinging structure (8).



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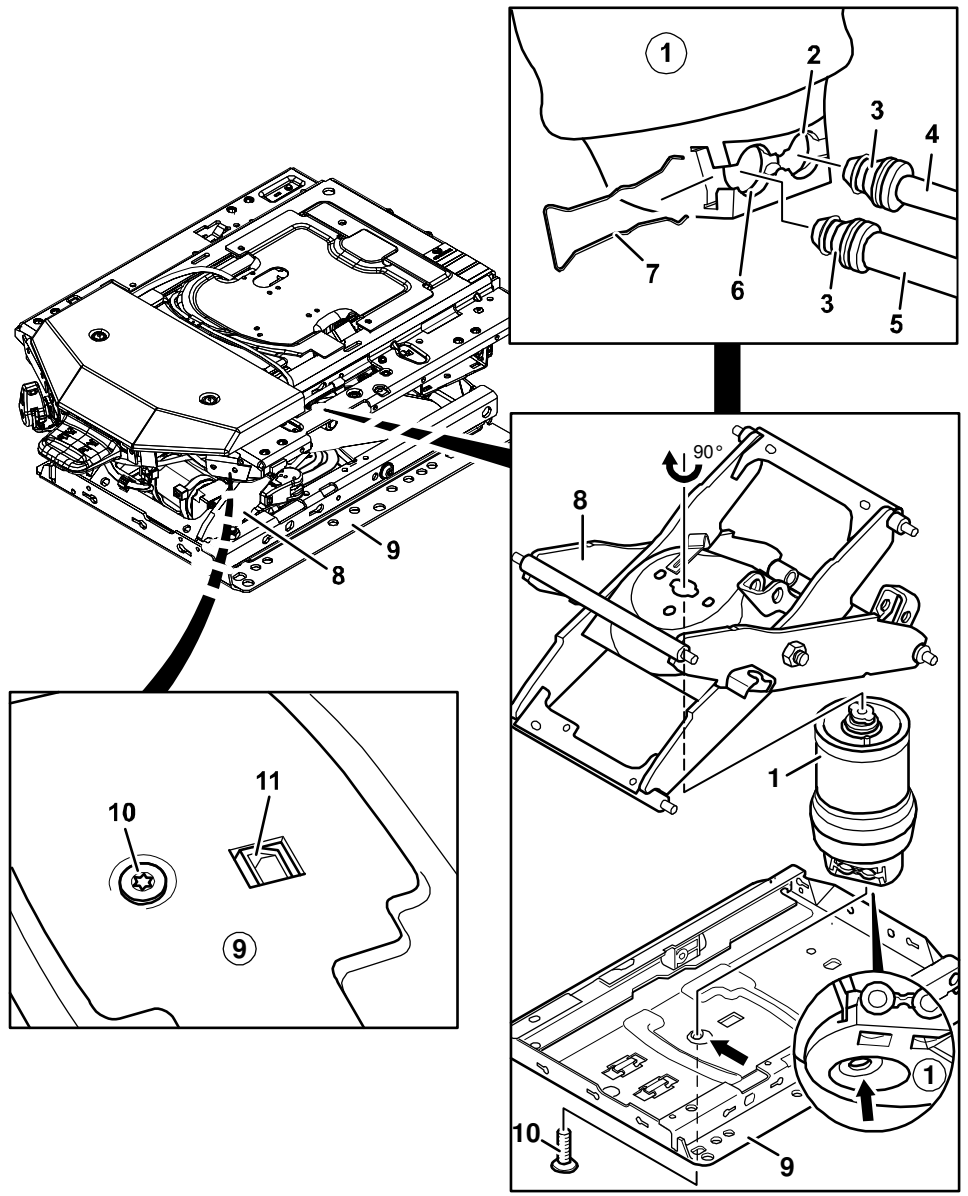
3.16 Air spring – removal and installation

9 Press the air spring (1) down and pull out of the swinging structure (8).

10 Remove the air spring (1) from the seat suspension.
Installation note:
The step (11) at the bottom of the air spring (1) must snap in the cut-out on the lower part of suspension (9).

11 Re-install the components in the reverse order of their removal.



3.17 Additional air supply – removal and installation (seat suspension MSG95GL)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the additional air supply (1). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the bellows from the upper suspension part (see Chapter 3.4).

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

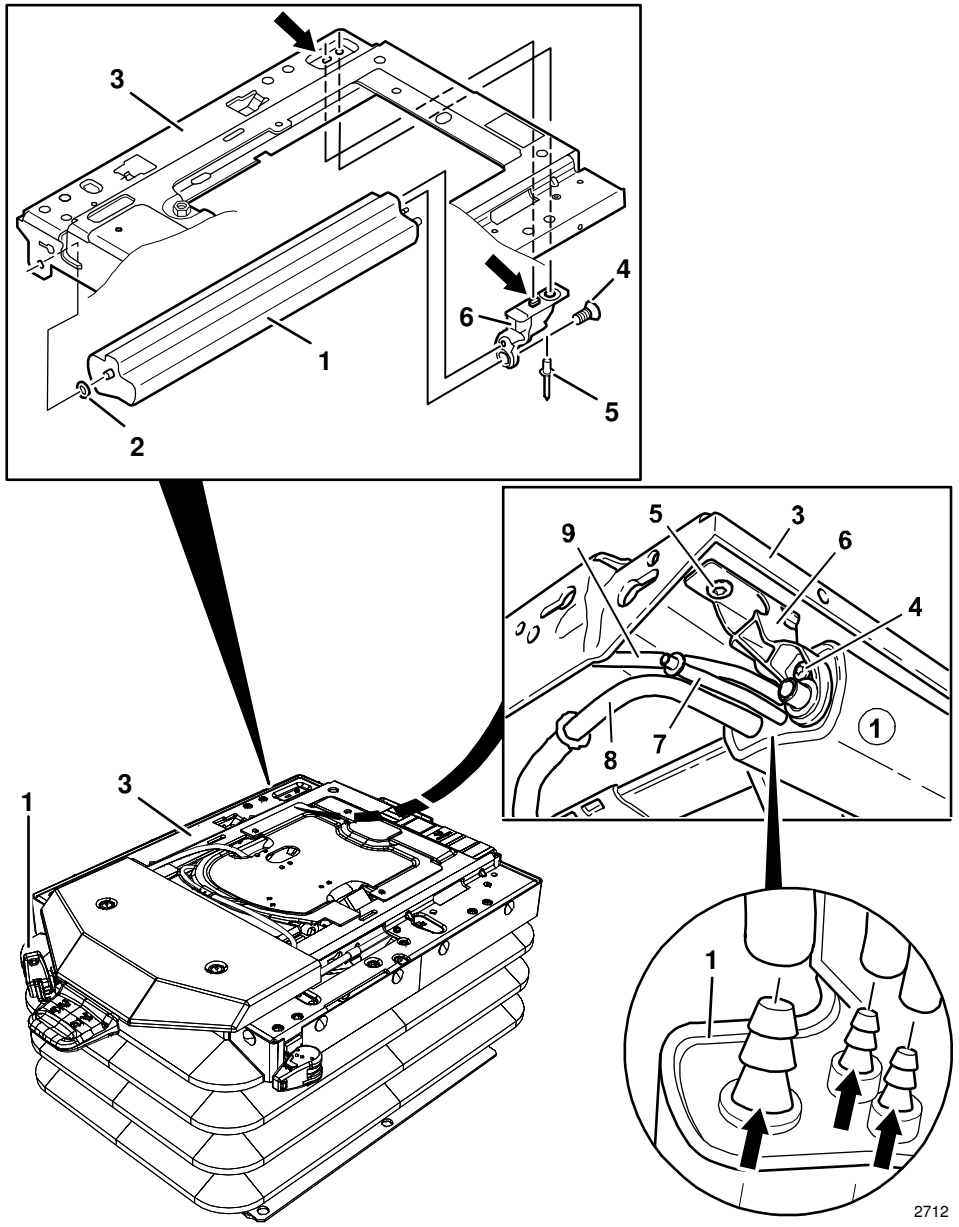
3 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the additional air supply (1).

4 ⚠ **WARNING!**
Take care not to damage the connections (mandrel profiles) of the additional air supply (1) and of the compressed-air hoses (7, 8, 9).

• Do not use a screwdriver or similar tools to lift off the compressed-air hoses (8, 9) at the connections (arrows) of the additional air supply (1).
• Repair works must be performed with the GRAMMER special tool kit Praticco.

5 Mark the compressed-air hoses (8, 9) with a sharp knife and cut off in a clean and straight way directly behind the connections (arrow) of the additional air supply (1).
Notes:
• The compressed-air hoses (8, 9) can be cut off only once.
• After cutting off, mark the compressed-air hoses (8, 9) in order not to cut it several times.
Installation notes:
• Install the compressed-air hoses (8, 9) according to the marking.
• Push the compressed-air hoses (8, 9) completely onto the respective connections (arrows) of the additional air supply (1).



3.17 Additional air supply – removal and installation (seat suspension MSG95GL)

6 If additional air supply (1) is defective:
Push the lock hose with plug (7) completely onto the respective connection (arrow) of the new additional air supply (1).

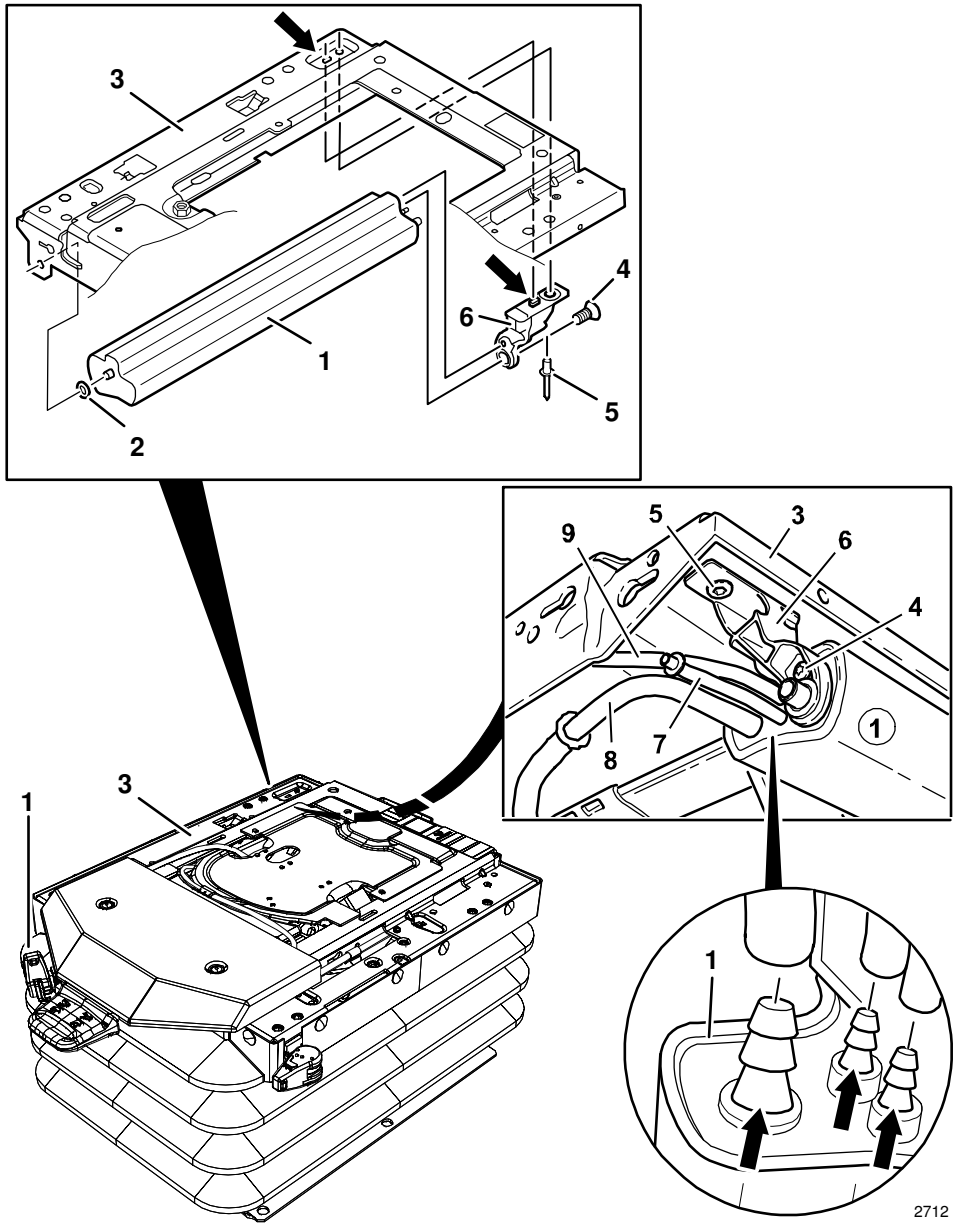
7 Bore out the rivet head and drive out the blind rivet (5).

8 Detach the additional air supply (1) at the upper suspension part (3) and remove it.
Installation note:
The nose (arrow) at the top part of the support (6) must click into place in the longitudinal drill hole (arrow) of the upper suspension part (3).

9 Pull off the sealing ring (2) at the additional air supply (1).

10 If the support (6) is defective:
Unscrew the rounded head screw (4) and remove the support (6) at the additional air supply (1).
Installation note:
Rounded head screw (4), 2.5 Nm.

11 Re-install the components in the reverse order of their removal.



3.18 Handle for height adjustment – removal and installation

Removal and installation

1 Remove the bellows at the upper suspension part (see Chapter 3.4) and press it down.

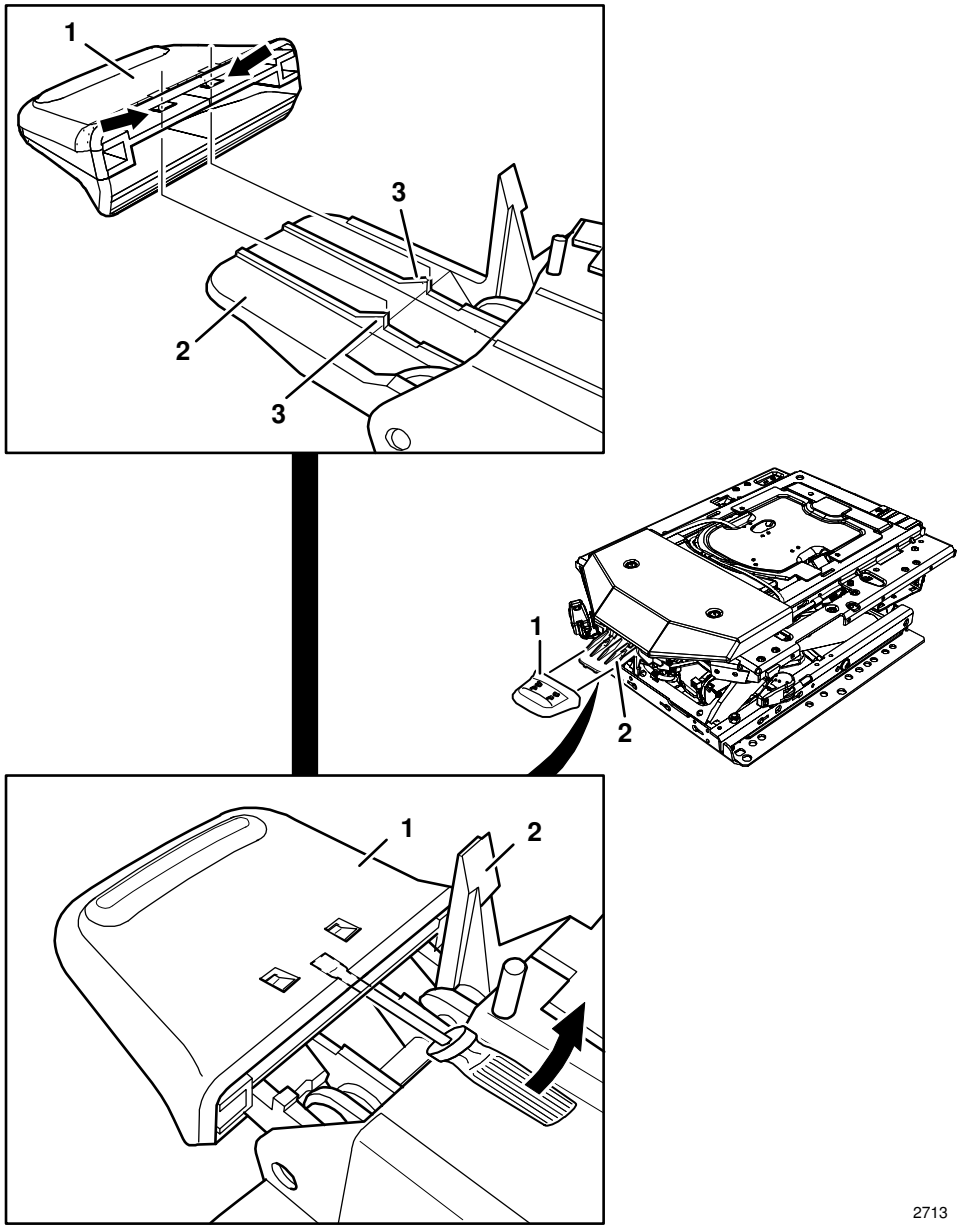
2 Press the height adjustment (1) handle upwards.

3 **ATTENTION**
Risk of breakage!
The handle for height adjustment (1) is wedged in the support (2) at the bottom of the support (2) by means of two latching noses (3). Carefully separate the parts. When the handle for height adjustment (1) is deformed, replace it.

Insert screwdriver at the bottom between handle (1) and lever (2) at the centre. Use a screwdriver to bend open the handle (1) until the two latching noses (3) and the opening (arrows) in the handle for height adjustment (1) are released.

4 Pull off the handle (1) at the lever.
Installation note:
Wedge the handle (1) onto the lever (2), until the two latching noses (3) snap in with an audible click in the handle for height adjustment.

5 Re-install the components in the reverse order of their removal.



3.19 Holder for height adjustment – removal and installation

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* Delivery option

3.19.1 Holder for height adjustment – removal and installation – with handle at the front (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the holder for height adjustment (1). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the front cover (Chapter 3.2).

3 Remove the bellows at the front of the upper suspension part (see Chapter 3.4).

4 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

5 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the holder for height adjustment (1).

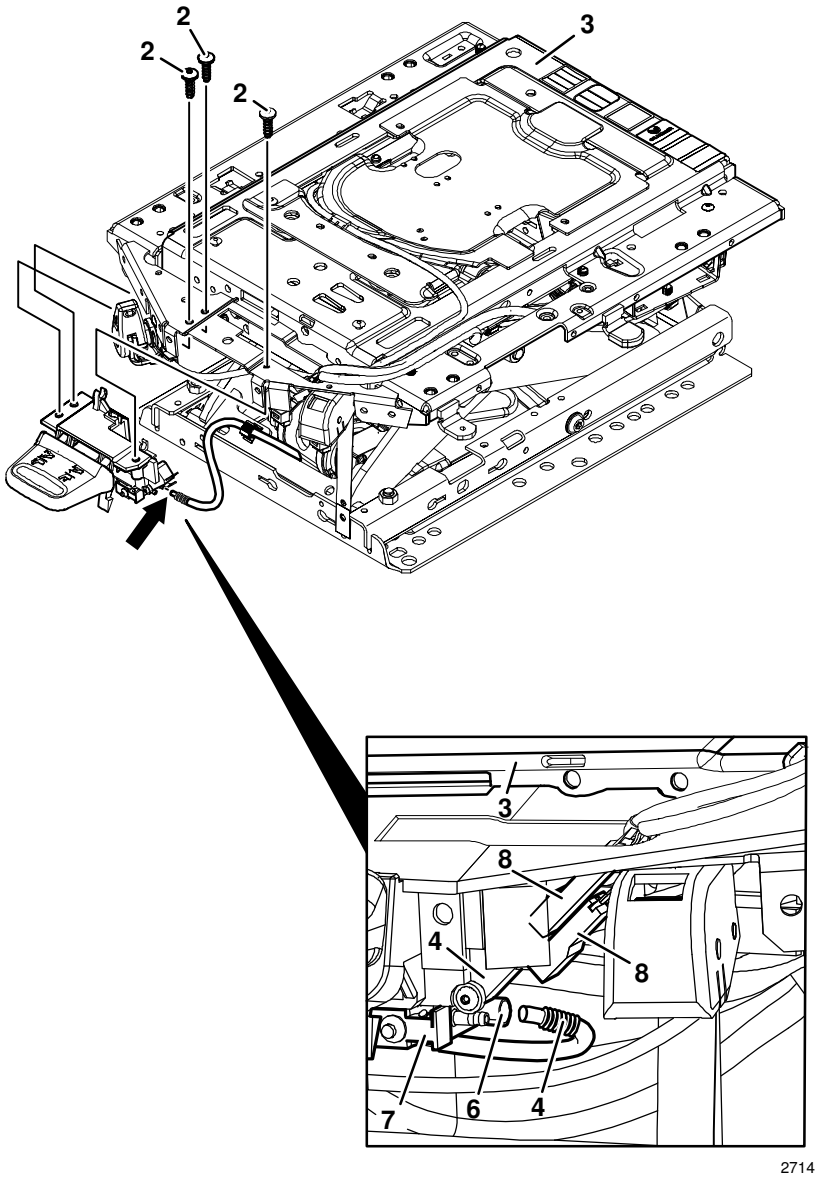
6 Mark and remove two plugs (8).
Installation note:
Re-establish the electrical connections according to the markings.

7 Undo the three round head screws (4) and pull the holder for height adjustment (1) to the front.
Installation note:
Round head screw (2), 2.5 Nm.

8 Pull off the hose nozzle (6) at the connection (arrow) and push it backwards at the compressed-air hose (5).

9 ⚠ **ATTENTION**
Do not damage the connection (arrow)!

- Do not use a screwdriver or similar tools to lift off the compressed-air hose (2) at the connection (arrow).
- Repair works must be performed with the GRAMMER special tool kit Praticco.



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3.19.1 Holder for height adjustment – removal and installation – with handle at the front (delivery option)

10 Cut off the compressed-air hose (5) with a sharp knife in a clean and straight way directly behind the connection (arrow).
Notes:
• The compressed-air hose (5) can be cut off only once.
• After cutting off, mark the compressed-air hose (5) in order not to cut it several times.
Installation note:
Push the compressed-air hose (5) completely onto the connection (arrow).

11 Remove rests of the hose from the connection (arrow).

12 If the handle for height adjustment (9) is defective:
Remove handle (9) (Chapter 3.18).

13 If the torsion spring (11) is defective:

13.1 Mark the installation position of the torsion spring (11).

13.2 Remove the bolt (12) and take out the handle rail (10) with torsion spring (11) from the support (13)
Installation note:
Install the torsion spring (11) and handle rail (10) according to the marking.

14 If the valve (7) is defective:

14.1 Remove the torsion spring (11) (see step 13).

14.2 Mark the installation position of the valve (7).

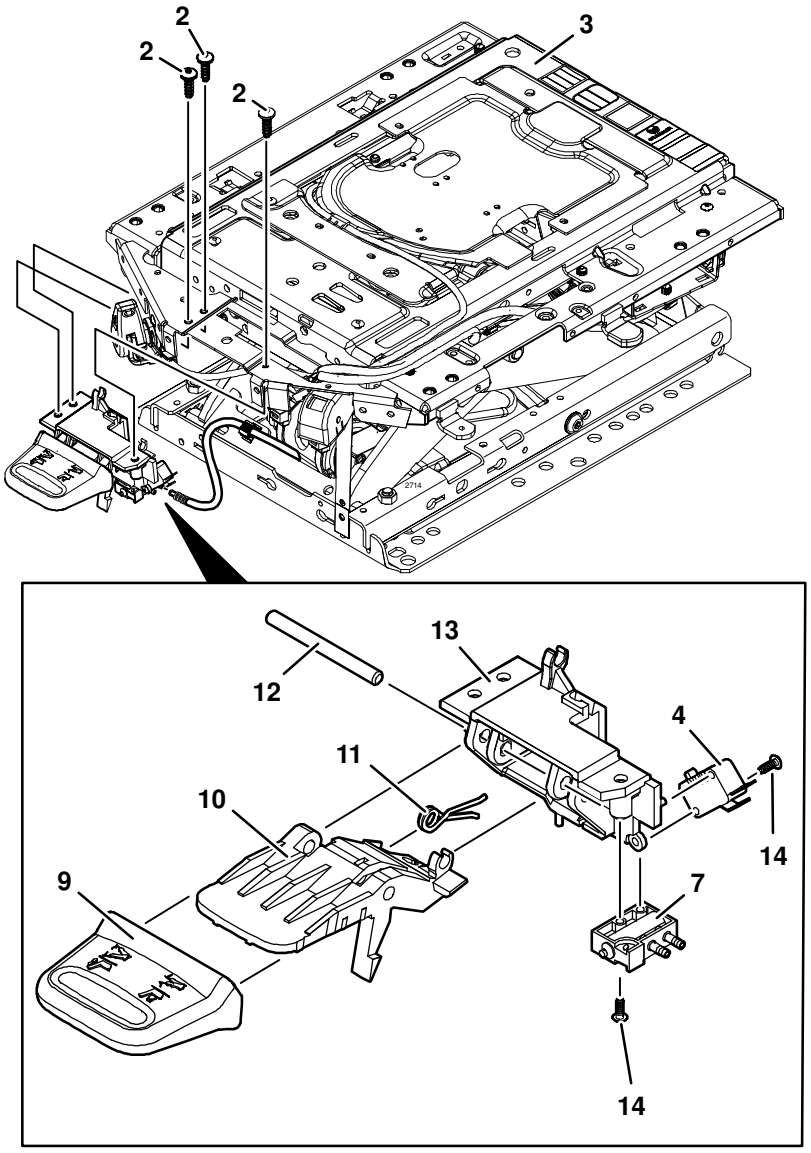
14.3 Undo the screw (14) and remove the valve (7) from the support (13).
Installation note:
Install the valve (7) according to the marking.

15 Micro-switch (4) is defective:

15.1 Mark the installation position of the micro-switch (4).

15.2 Undo the screw (14) and remove the micro-switch (4) from the support (13).
Installation note:
Install the micro-switch (4) according to the marking.

16 Re-install the components in the reverse order of their removal.



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3.19.2 Holder for height adjustment – removal and installation – with handle on the left (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the holder for height adjustment (1). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the bellows from the upper suspension part on the left (see Chapter 3.4).

3 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

4 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the holder for height adjustment (1).

5 Mark and remove two plugs (4).
Installation note:
Re-establish the electrical connections

6 Undo the two round head screws (4) and pull the holder for height adjustment (1) to the front.
Installation note:
Round head screw (2), 2.5 Nm.

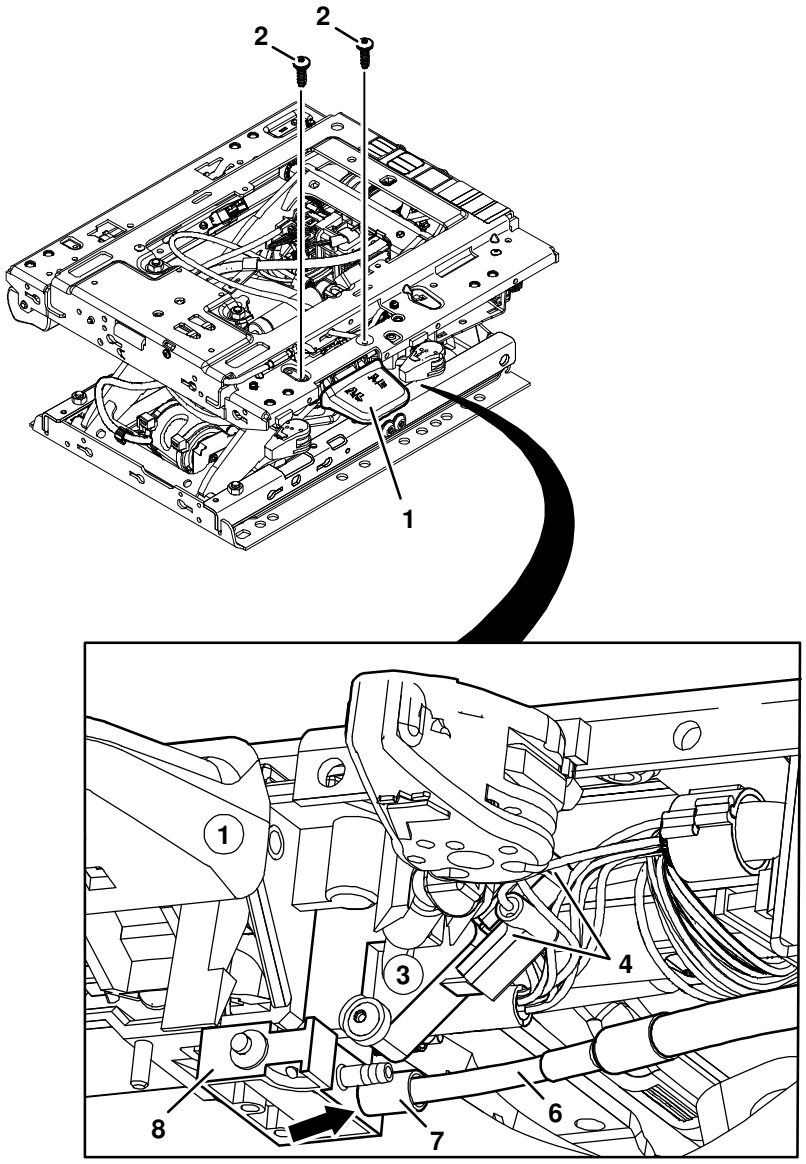
7 Pull off the hose nozzle (7) at the connection (arrow) and push it backwards at the compressed-air hose (6).

8 ⚠ **ATTENTION**
Do not damage the connection (arrow)!

- Do not use a screwdriver or similar tools to lift off the compressed-air hose (6) at the connection (arrow).
- Repair works must be performed with the GRAMMER special tool kit Praticco.

10 Cut off the compressed-air hose (6) with a sharp knife in a clean and straight way directly behind the connection (arrow) and remove the rest of the hose at the connection (arrow)
Notes:
- The compressed-air hose (6) can be cut off only once.
- After cutting off, mark the compressed-air hose (6) in order not to cut it several times.

Installation note:
Push the compressed-air hose (6) completely onto the connection (arrow).



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3.19.2 Holder for height adjustment – removal and installation – with handle on the left (delivery option)

11 If the handle for height adjustment (9) is defective:
Remove handle (9)
(Chapter 3.18).

12 If the torsion spring (11) is defective:

12.1 Mark the installation position of the torsion spring (11).

12.2 Remove the bolt (12) and take out the handle rail (10) with torsion spring (11) from the support (13)
Installation note:
Install the torsion spring (11) and handle rail (10) according to the marking.

13 If the valve (8) is defective:

13.1 Remove the torsion spring (11) (see step 12).

13.2 Mark the installation position of the valve (8).

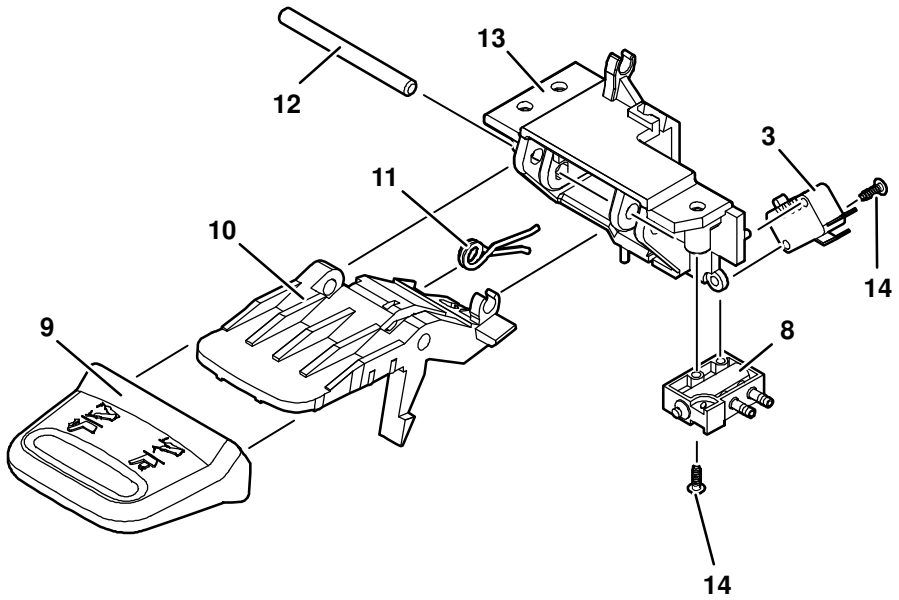
13.3 Undo the screw (14) and remove the valve (8) from the support (13).
Installation note:
Install the valve (8) according to the marking.

14 If the Microswitch (3) is defective:

14.1 Mark the installation position of the micro-switch (3).

14.2 Undo the screw (14) and remove the micro-switch (3) from the support (13).
Installation note:
Install the micro-switch (3) according to the marking.

15 Re-install the components in the reverse order of their removal.



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3.20 Cable harness for vehicle connection – removal and installation

Removal and installation

1 Remove the bellows at the back and left of the upper suspension part (see Chapter 3.4).

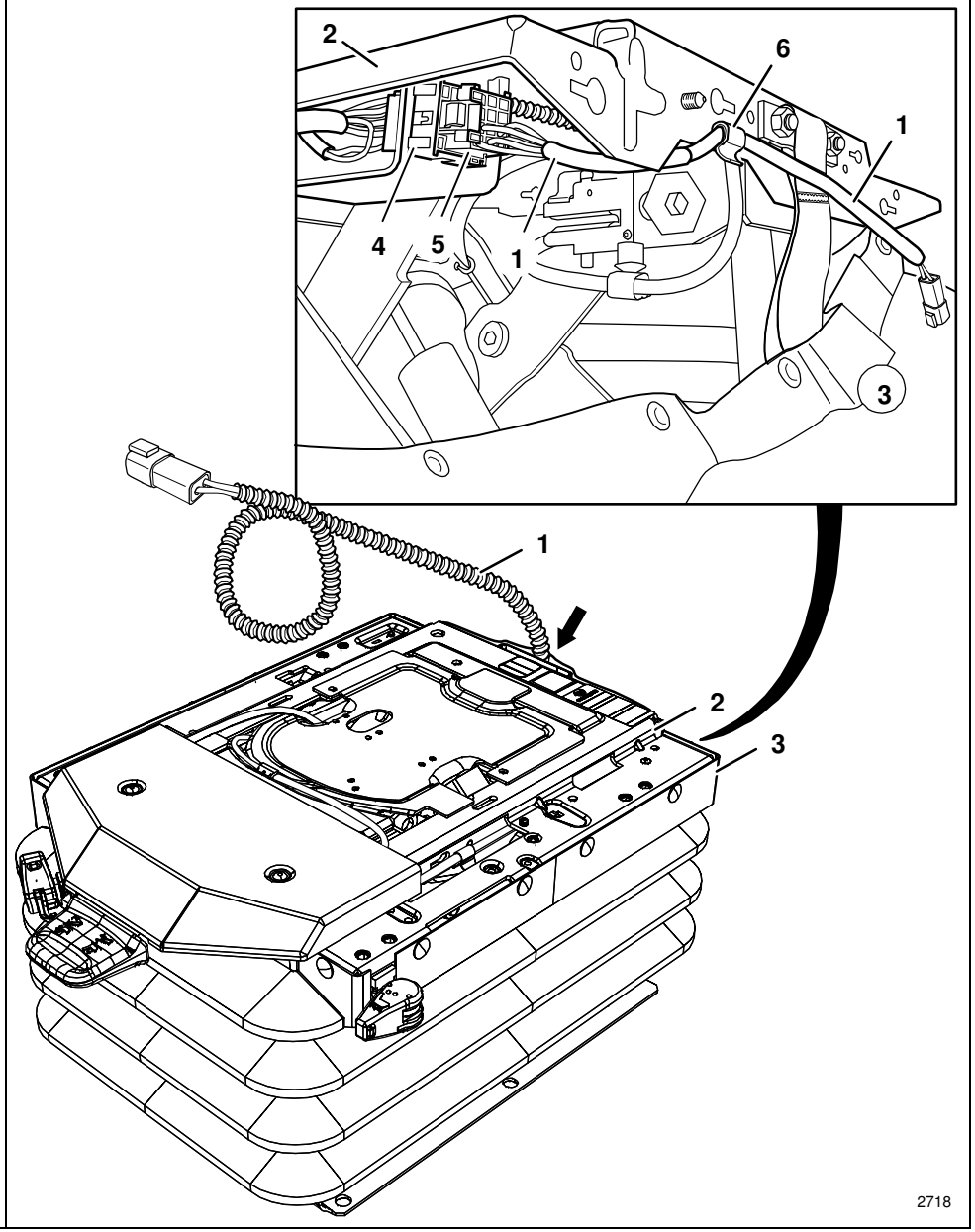
2 Press the bellows in the hung out area downwards.

3 Detach the cable harness for vehicle connection (1) at the clamp (6).

4 Disconnect electrical connection (5).

5 Remove the cable harness for vehicle connection (1).
Installation note:
The cable harness for vehicle connection (1) is guided out of the seat suspension between the bellows (3) and the upper suspension part (2) at the rear in the middle (arrow).

6 Re-install the components in the reverse order of their removal.



3.21 Cable harness for seat suspension – removal and installation

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* Delivery option

3.21.1 Cable harness for seat suspension – removal and installation – with handle at the front (delivery option)

Removal and installation

1 Remove the seat suspension (Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Remove the bellows from the upper suspension part (see Chapter 3.4).

4 Remove the cable harness for vehicle connection (Chapter 3.20).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to high position and secure it at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 Remove the right-angle plug from the compressor (9) (see Chapter 3.12).

7 Release the plug (6) at the U-profile (7).

8 Disconnect the electrical connections (8) at the micro-switch (9) (see Chapter 3.19).

9 Bore out the two rivet heads (11) and drive out the blind rivets.

10 Pull off the plug (3) from the angle plate (2).

11 Mark the points where the cable harness (1) is secured with the cable clamps (4), and remove the cable clamps (4).

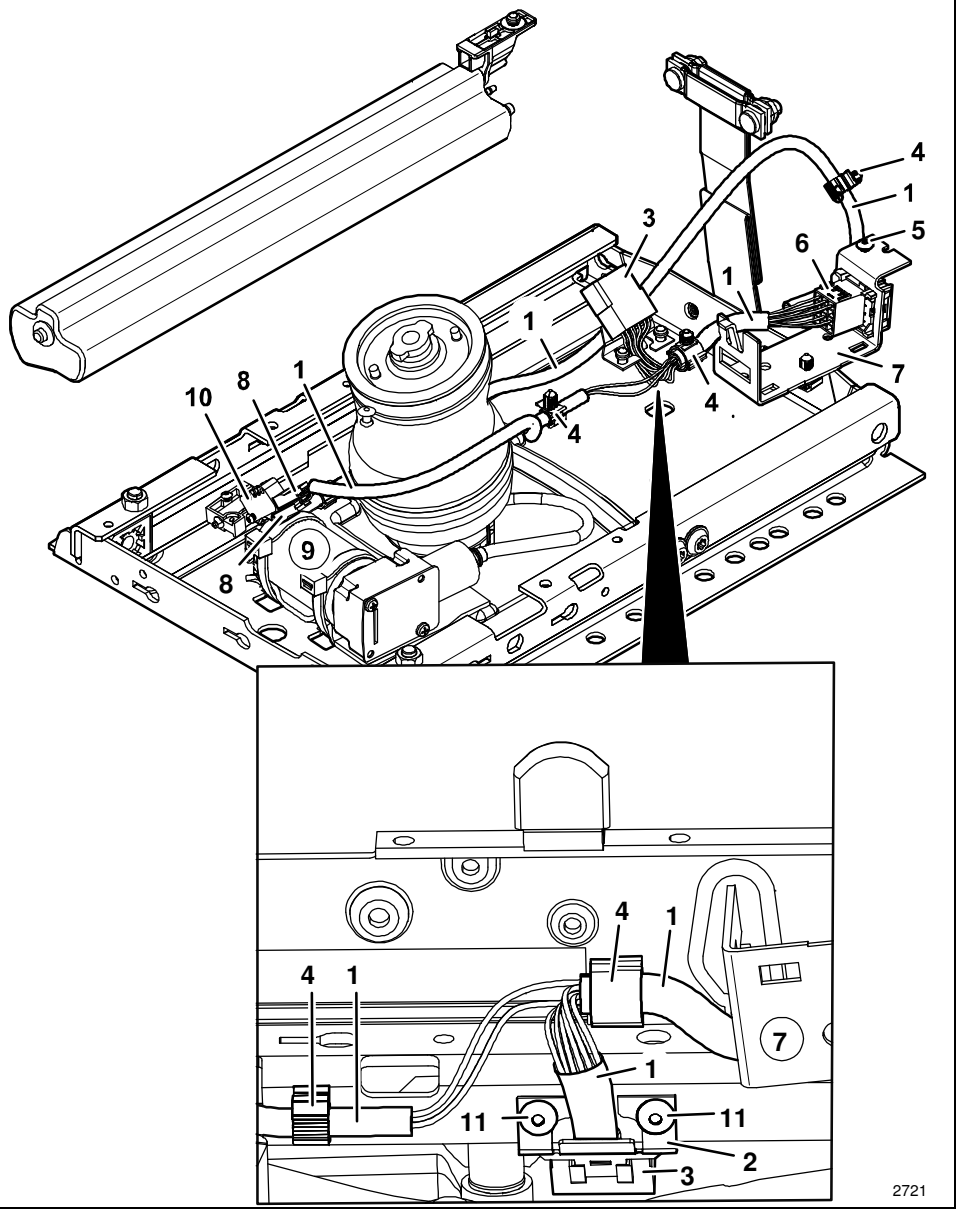
12 Mark the installation position of the cable harness (1) and remove the cable harness from the seat suspension in upward direction.
Installation note:
Install the cable harness (10) according to the marking.

13 If U-profile (7) is defective:

13.1 Bore out the rivet head (5) and drive out the blind rivet.

13.2 Detach U-profile (7) at the upper suspension part:

14 Re-install the components in the reverse order of their removal.



3.21.2 Cable harness for seat suspension (with compressed air hose) – removal and installation – seat suspension MSG95G with handle on the left (delivery option)

Removal and installation

⚠ **WARNING** Hydrostatic test!

Hydraulic test of the seat suspension should be performed upon installation of the compressed air hose (1). To do this, apply 60 kg load to the suspension for 24 hours. The lowering within this time may not exceed 15 mm.

1 Remove the seat suspension (Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Remove the bellows (Chapter 3.4).

4 Remove the cable harness for vehicle connection (Chapter 3.20).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 ⚠ **WARNING!** The pressure in the pneumatic system may cause injury!

The pneumatic system is to be vented before removing the compressed-air hose (1).

7 Bore out the two rivet heads (8) and drive out the blind rivet (7).

8 Pull off the plug (3) from the angle plate (2).

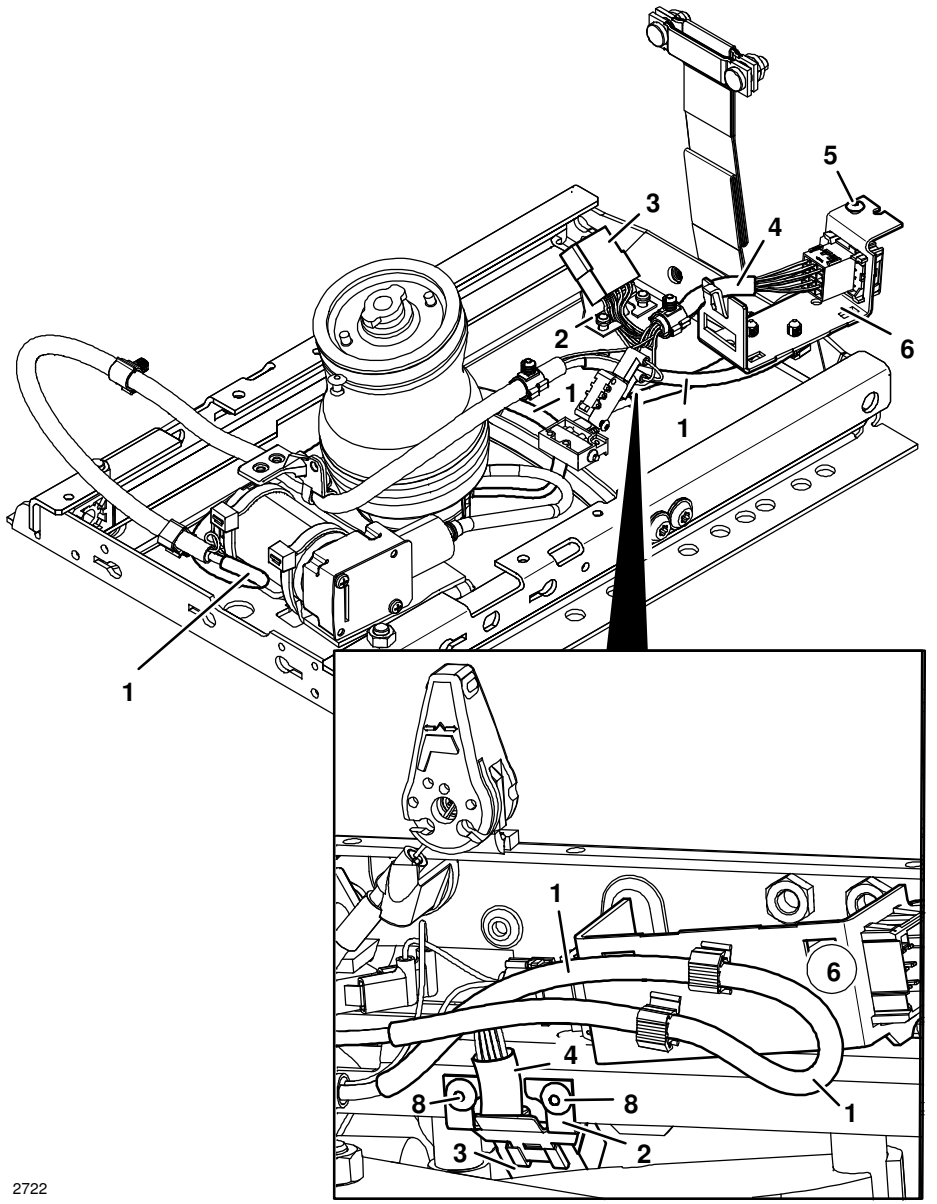
9 Remove the compressed-air hose (1) with cable harness (4) (Chapter 3.15.3).

10 If U-profile (6) is defective:

10.1 Bore out the rivet head (5) and drive out the blind rivet.

10.2 Detach U-profile (6) at the upper suspension part:

11 Re-install the components in the reverse order of their removal.



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3.21.3 Cable harness for seat suspension – removal and installation – seat suspension MSG95GL with handle on the left (delivery option)

Removal and installation

1 Remove the seat suspension (Chapter 3.1).

2 Remove the top cover (Chapter 3.2).

3 Remove the bellows from the upper suspension part (see Chapter 3.4).

4 Remove the cable harness for vehicle connection (Chapter 3.20).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 Remove the right-angle plug from the compressor (10) (see Chapter 3.12).

7 Release the plug (5) at the U-profile (7).

8 Disconnect the electrical connections (8) at the micro-switch (9) (see Chapter 3.19).

9 Bore out the two rivet heads (12) and drive out the blind rivets.

10 Pull off the plug (3) from the angle plate (2).

11 Mark the points where the cable harness (1) is secured with the cable clamps (4), and remove the cable clamps (4).

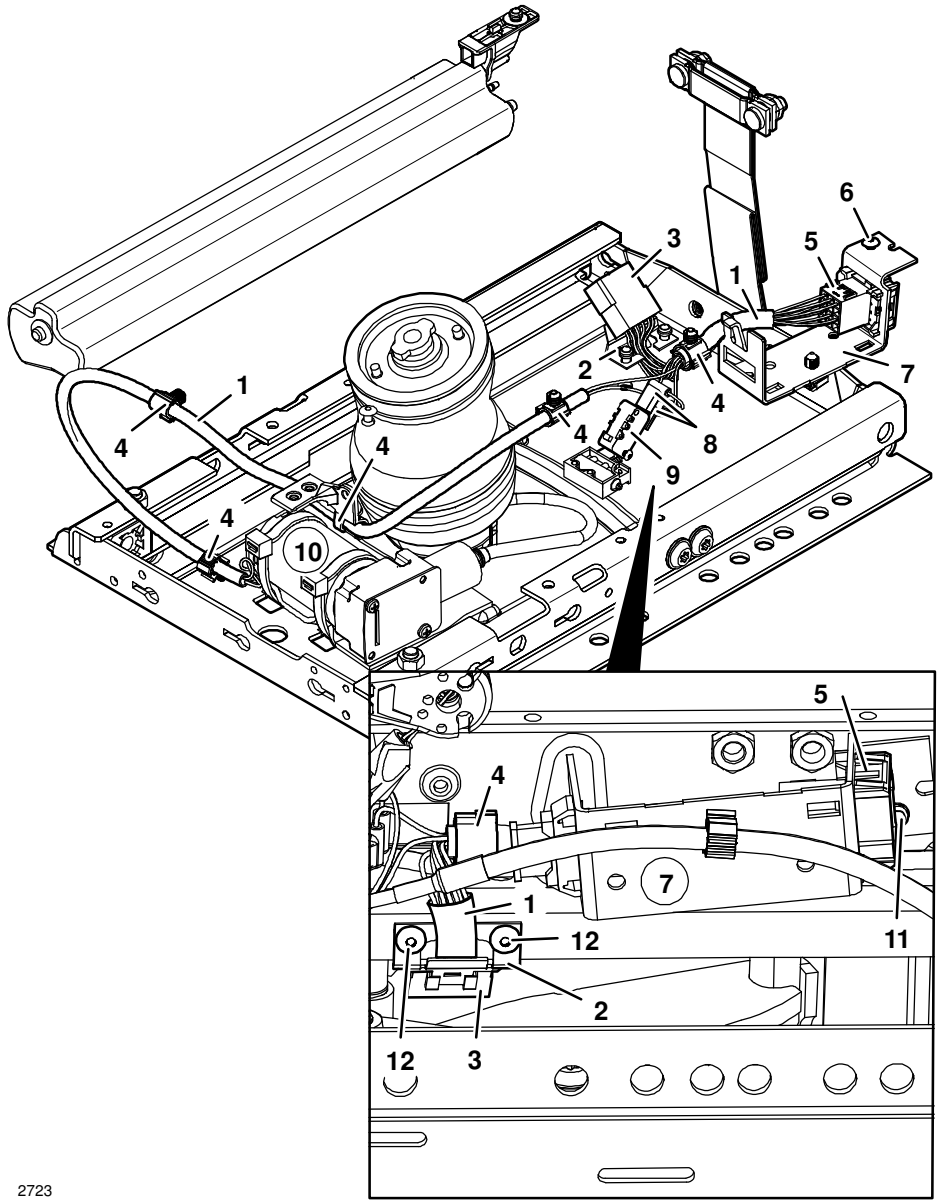
12 Mark the installation position of the cable harness (1) and remove the cable harness from the seat suspension in upward direction.
Installation note:
Install the cable harness (10) according to the marking.

13 If U-profile (7) is defective:

13.1 Bore out the rivet head (6) and drive out the blind rivet (11).

13.2 Detach U-profile (7) at the upper suspension part:

14 Re-install the components in the reverse order of their removal.



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3.22 Upper part of suspension – removal and installation

Removal and installation

Notes:
- The locking mechanism for the fore/aft isolator is preassembled at the upper suspension part (1).
- Furthermore, a buffer and a clamp are preinstalled at the upper suspension part (1).
- Reuse or convert assemblies which are not included in the scope of delivery of the new upper suspension part (1).

1 Remove the seat suspension (Chapter 3.1).

2 Remove the front cover (Chapter 3.2).

3 Remove the top cover (Chapter 3.3).

4 Remove the bellows from the upper suspension part (see Chapter 3.4).

5 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 Seat suspension with adjustable vertical shock absorbers:

6.1 Remove the handle for vertical shock absorber adjustment (Chapter 3.5).

6.2 Remove the Bowden pull wire for vertical shock absorber adjustment at the upper suspension part (see Chapter 3.6).
Note:
Bowden pull wire for vertical shock absorber adjustment remains installed at the vertical shock absorber.

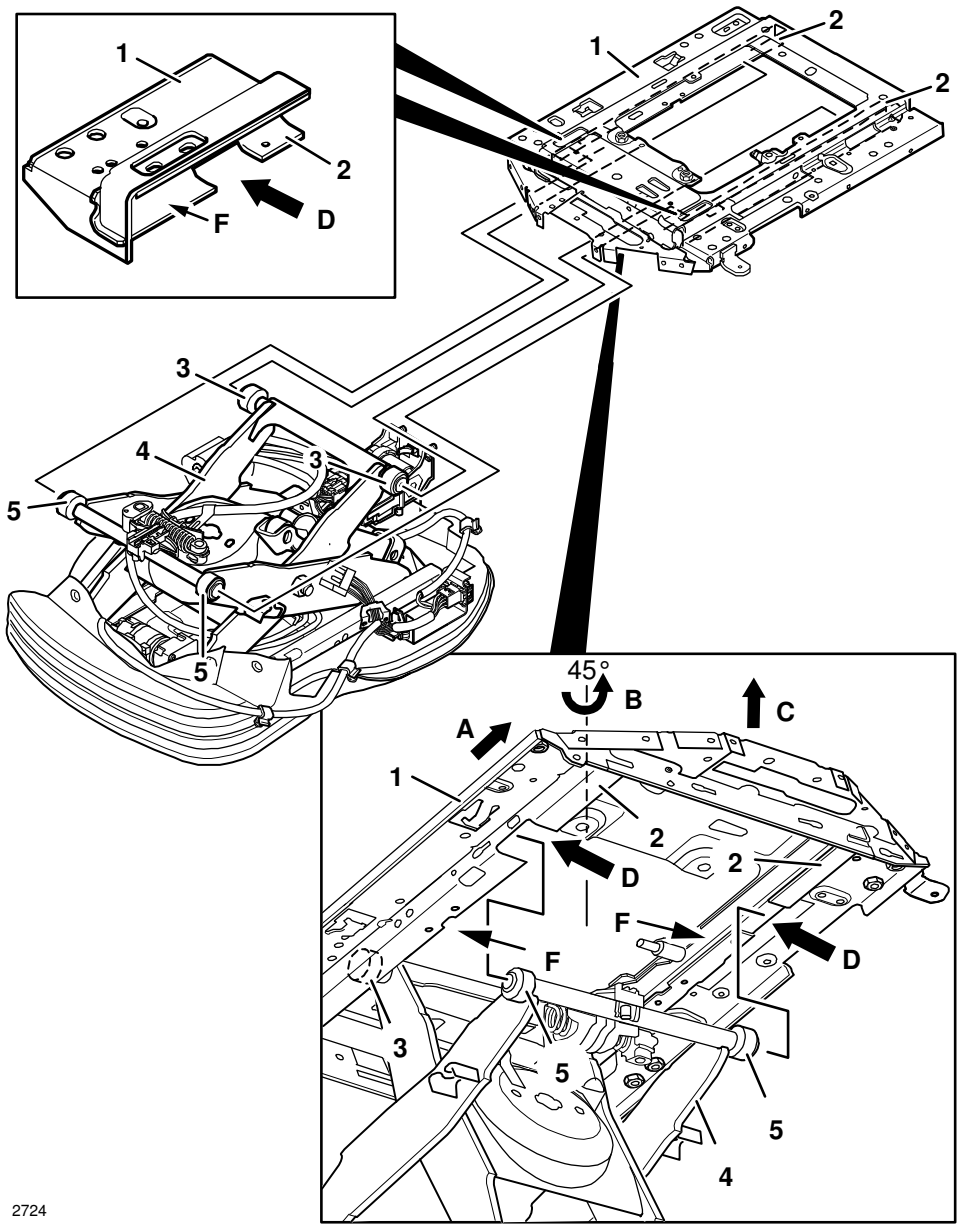
7 Seat adjustment with fore/aft isolator:

7.1 Remove the fore/aft isolator unit from the upper suspension part (1) (see Chapter 3.9).
Note:
Clamp remains at the swinging structure.

7.2 Remove the longitudinal horizontal shock absorber from the upper suspension part (1) (see Chapter 3.8).

8 Seat adjustment without fore/aft isolator:
Remove the fixed bearing from the upper suspension part (1) (see Chapter 3.24).

9 Seat suspension with secondary belt:
Remove the secondary belt from the upper suspension part (1) (see Chapter 3.24).



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3.22 Upper part of suspension – removal and installation

10 Remove the level indicator from the upper suspension part (1) (see Chapter 3.14).
Note:
The indicator ribbon remains installed at the lower suspension part.

11 Mark locations at the upper suspension part (1) where compressed-air hoses or cable harnesses are fixed, and remove cable clamp.

12 Seat suspension MSG95GL:
Remove additional air supply and support at the upper suspension part (1).

13 Remove the holder for height adjustment (Chapter 3.19).

14 Remove the angle plate from the upper suspension part (1) (see Chapter 3.21).
Note:
Do not separate plug and angle plate.

15 Remove the cable harness for vehicle connection (Chapter 3.20).

16 Remove the U-profile from the upper suspension part (see Chapter 3.21).
Note:
Do not release the plug at the U-profile.

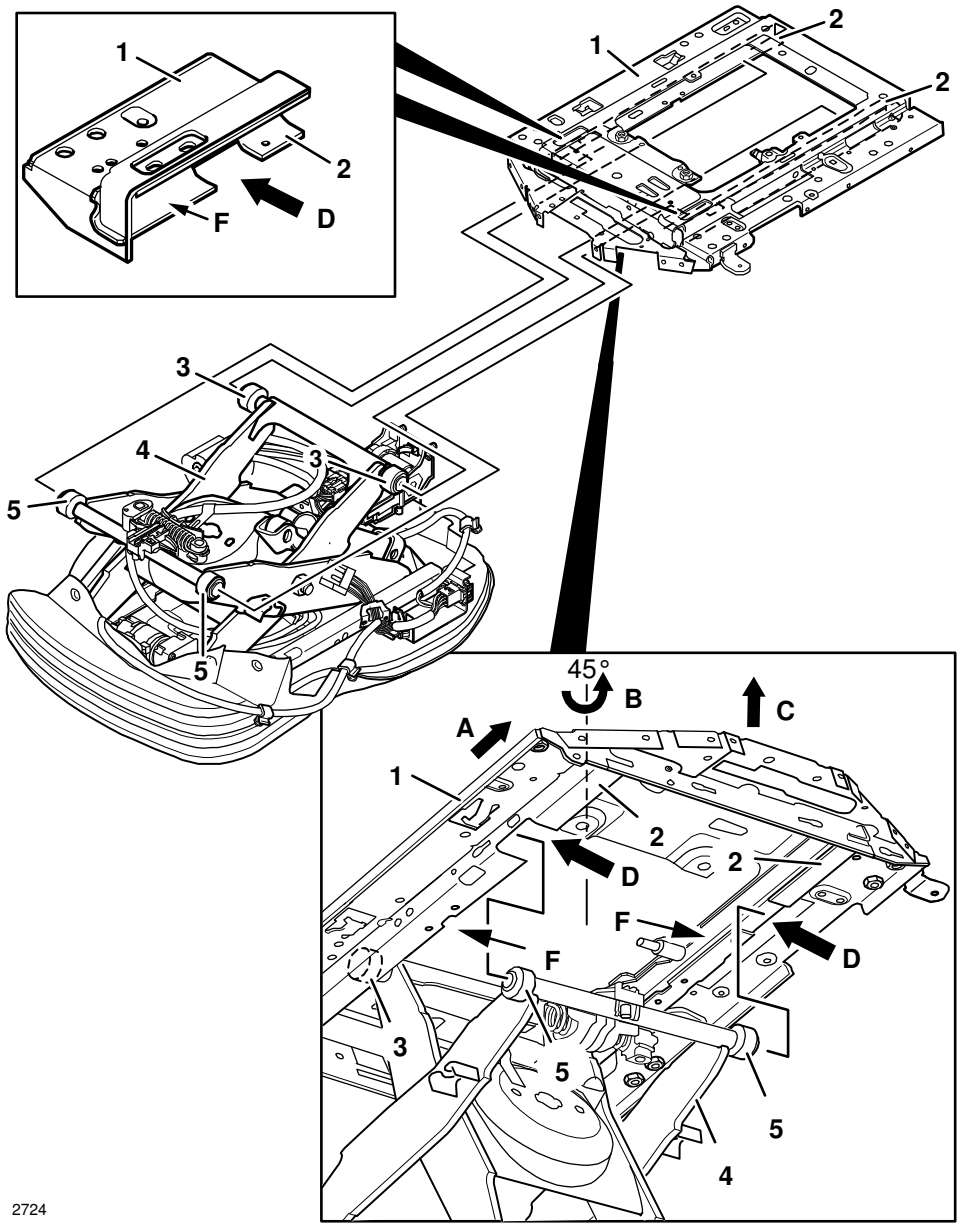
17 Push the upper suspension part (1) forwards (arrow A) until the cut-outs (arrow D) on the left and right sides at the guiding rails (2) are located at the same height with the front rollers (5).

18 Lift out the upper suspension part (1) over the front rollers (5).

19 Turn upper suspension part (1) by ca 45 degrees to the side (arrow B) and then lift off at the back rollers (3) to the top (arrow C).
Installation notes:
• Apply acid-free multi-purpose lubricant to the side surfaces (F) of the two guiding rails (2) of the rollers (3, 5).
• Seat adjustment without fore/aft isolator:
Remove the fore/aft isolator lock at the new upper seat suspension part (Chapter 3.11).

20 If the rollers (3) are defective:
Pull the two front rollers (5) and two rear rollers (3) off the axles of the swinging structure (4).

21 Re-install the components in the reverse order of their removal.



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3.23 Lower part of suspension – removal and installation

Removal and installation

Note:
The end stops (3) with buffer (4) are preassembled on the new lower suspension part (1).

1 Remove the bellows from the lower suspension part (1) (see Chapter 3.4), push it upwards and fasten it to the upper suspension part.

2 ⚠ **WARNING!** Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

3 Remove indicator ribbon of the level indicator from the lower suspension part (1) (see Chapter 3.14).

4 Unscrew the countersunk screw a from the air spring at the lower suspension part (see Chapter 3.16).

5 Mark locations at the lower suspension part (1) where compressed-air hoses or cable harnesses are fixed, and remove cable clamp.

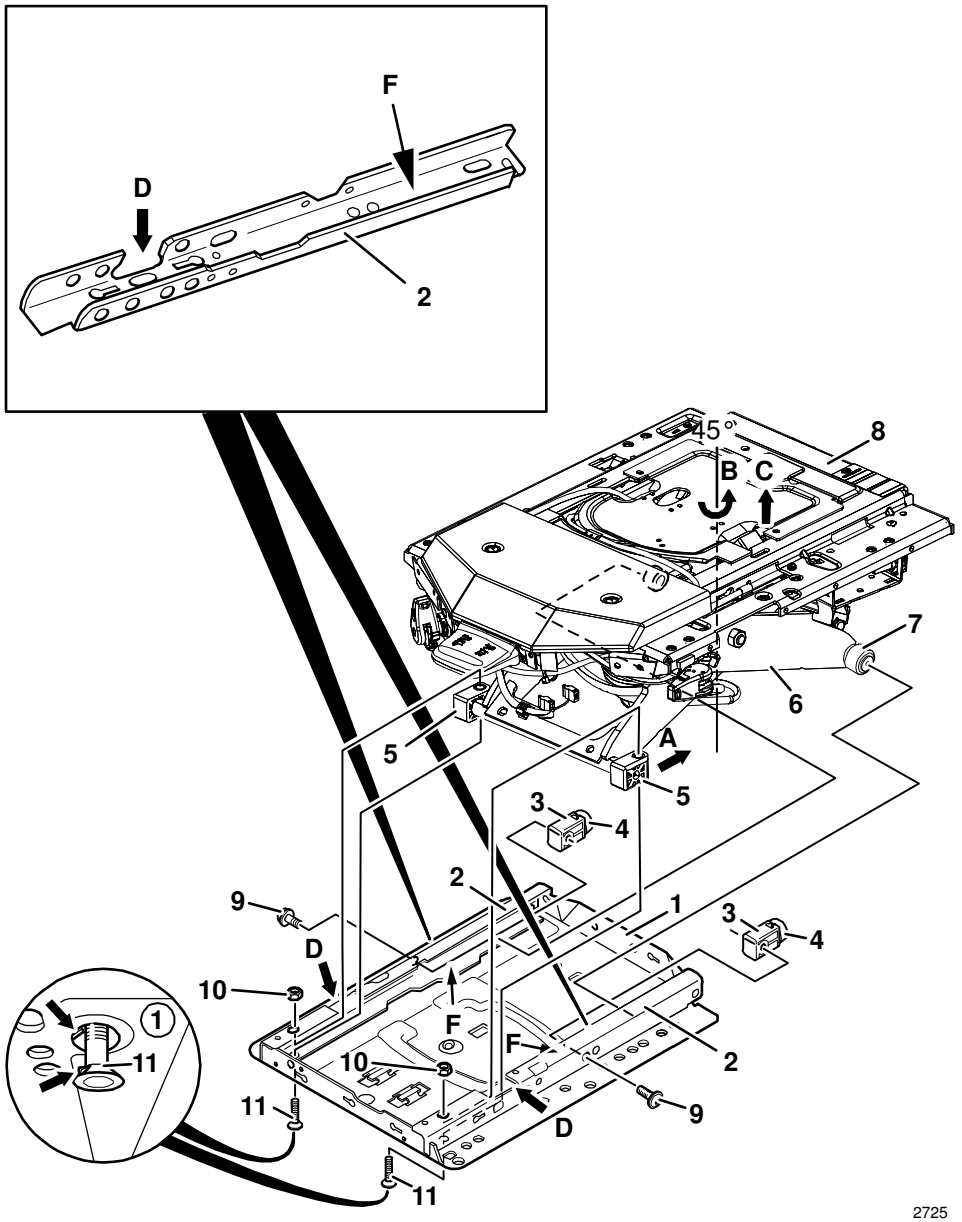
6 Remove the compressor from the lower suspension part (1) (see Chapter 3.12).
Note:
- Compressed air hose at compressor – do not remove the air spring
- To be protected against shocks and impacts, fix the compressor to the air spring (e.g. by means of adhesive tape).

7 ⚠ **WARNING!**
Risk of crushing!

Do not touch the suspension or reach into the swinging structure.

8 Unscrew two hexagon nuts (10).
Installation note:
Replace the hexagon nut (10) by a new one, 25 Nm.

9 Remove the two countersunk screws (11) from the fixed bearing (5) and drive out lower suspension part (1).
Installation note:
The cam (arrow) at the head of the countersunk screw (11) must engage in the groove (arrow) of the lower suspension part (1).



3.23 Lower part of suspension – removal and installation

10 Push the swinging structure (6) backwards (arrow A) until the two fixed bearings (5) at the swinging structure (6) fit through the cut-out (arrow D) of the left and right guiding rail (2) of the lower suspension part (1).

11 Lift the swinging structure (6) with the two fixed bearings (5) out of the guiding rails (2) of the lower suspension part (1) at the front.

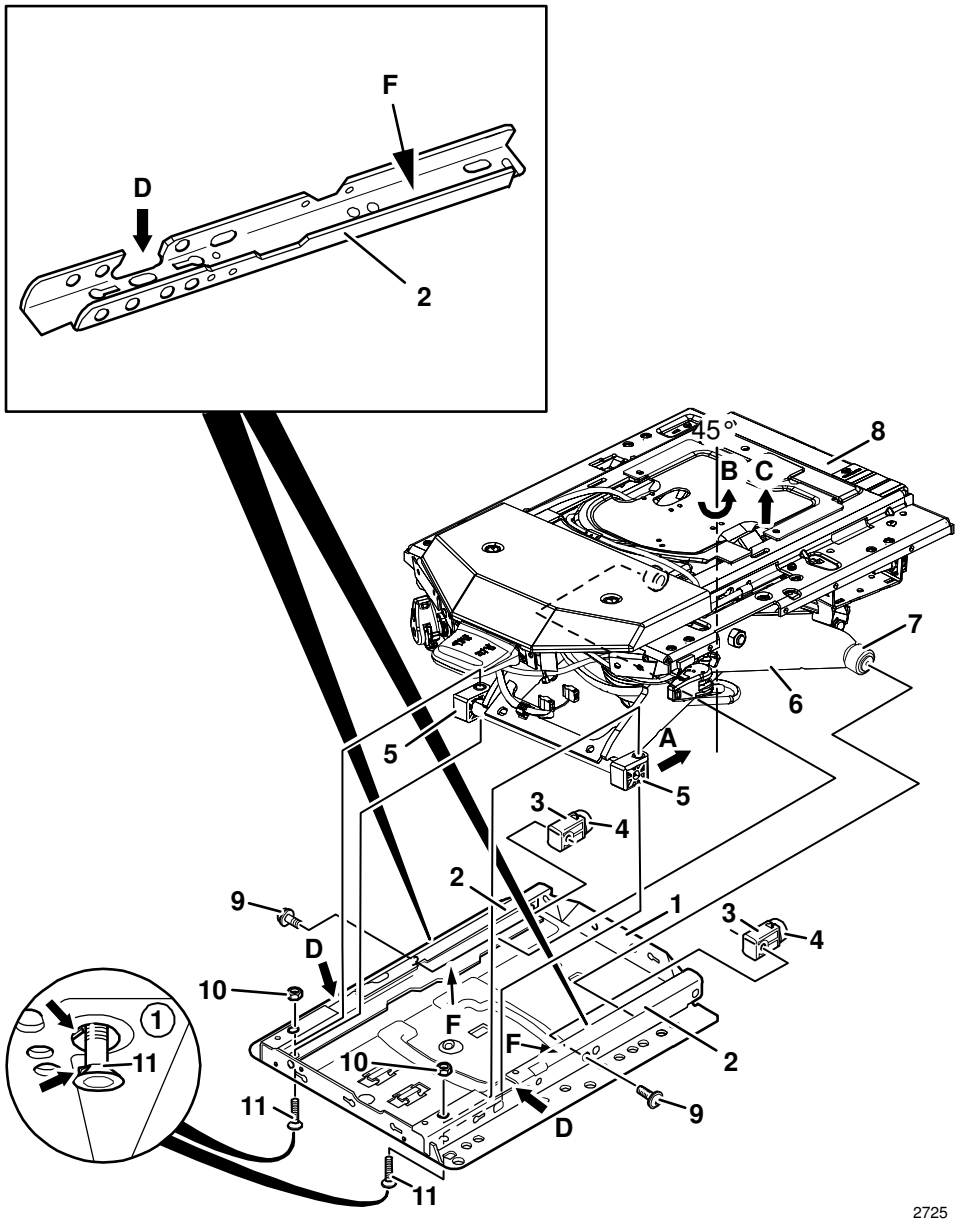
12 Unscrew two collar screws (9) and remove the end stops (3) with the buffer (4) from the guiding rails (2).
Installation note:
Collar screw (9), 6 Nm.

13 Laterally turn the swinging structure (6) with the attached upper suspension part (8) by approx. 45° (arrow B) to pull the two rollers (7) out of the guiding rails (2) and then_ lift it off in upward direction (arrow C).

14 Remove the lower suspension part (1).
Installation note:
Apply acid-free multi-purpose lubricant to the side surfaces (F) of the two guiding rails (2) in the area where rollers are moved.

15 If the rollers (7) are defective:
Pull off the two back rollers (7) at the axles of the swinging structure (6).

16 Re-install the components in the reverse order of their removal.



3.24 Fixed bearings – removal and installation (delivery option)

Removal and installation

1 Remove the upper seat part at the seat suspension (see Chapter 3.1).

2 Handle at the front:
Remove the front cover (Chapter 3.3).

3 Remove the top cover (Chapter 3.2).

4 Remove the bellows from the front upper suspension part (1) (see Chapter 3.4).

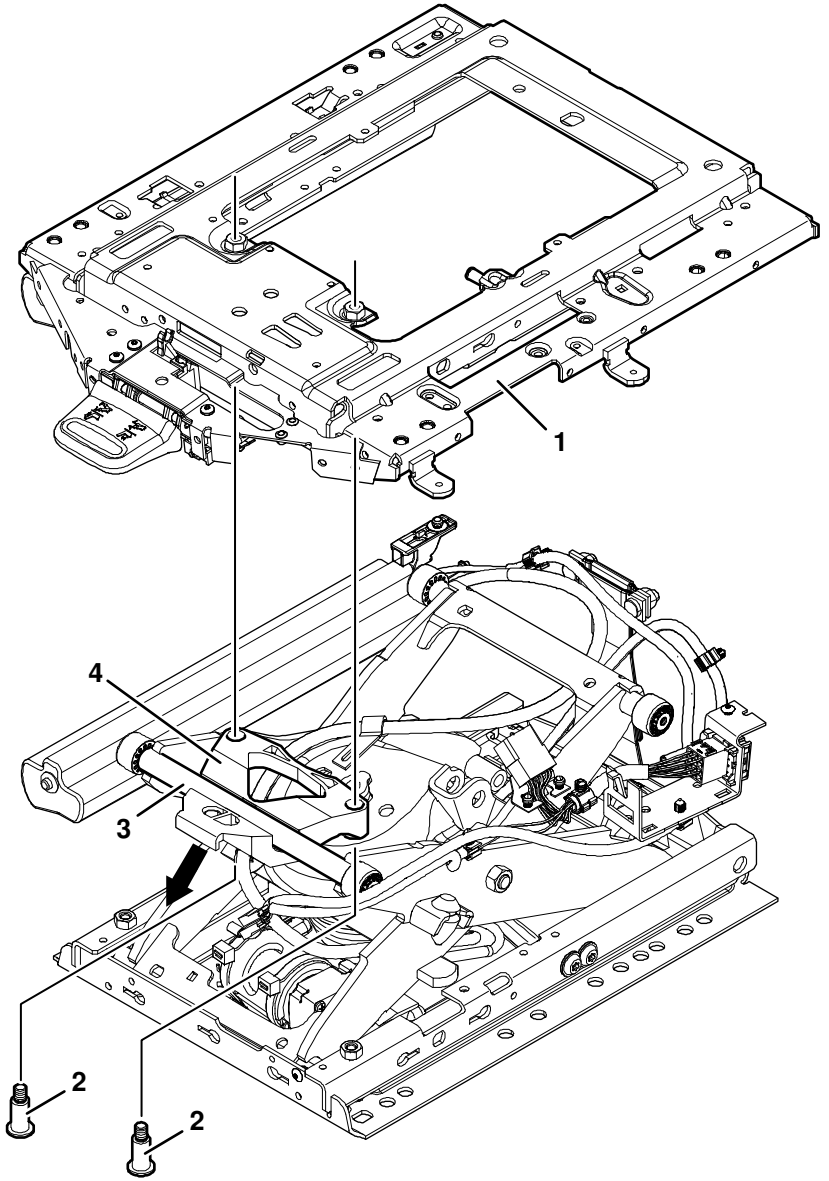
5 ⚠ **WARNING!**
Risk of crushing!

Move the seat suspension to the highest position and secure at the back between the swinging structure and the lower suspension part by means of suitable spacers.

6 Undo the two collar screws (2).
Installation note:
Collar screw (3), 25 ± 5 Nm.

7 Press the fixed bearing (4) off the swinging structure (3) in downward direction (arrow) and take it out of the seat suspension.

8 Re-install the components in the reverse order of their removal.



3.25 Worn parts – replacement

Removal and installation

1 Perform preparatory works for the respective components (see Chapter for components).

2 Remove hexagon nut (1) (see chapter 3.13 and 3.23).
Installation note:
Hexagon nut (1), 25 ± 5 Nm.

3 Remove buffer (2) (see Chapter 3.9)

4 Remove fixed bearing (3) (see chapter 3.23).

5 Remove roller (4) (see chapter 3.22 and 3.23).

6 Remove clearance spacers (5) (see Chapter 3.8)

7 Remove blind rivet, 5 x 10 (6) (see Chapter 3.21.2).

8 Remove blind rivet, 4.8 x 15.5 (7) (see Chapter 3.9).

9 Remove buffer (8) (see Chapter 3.9)

10 Remove socket (9) (see Chapter 3.9)

11 Remove countersunk screw, inner race (10) (see chapter 3.16).
Installation note:
Countersunk screw (10), 6 Nm.

12 Press the buffer (11) off the support at swinging structure (24).

13 Remove collar screw, inner race (12) (see chapter 3.23).
Installation note:
Collar screw (10), 6 Nm.

14 Remove end stop (13) (see chapter 3.23).

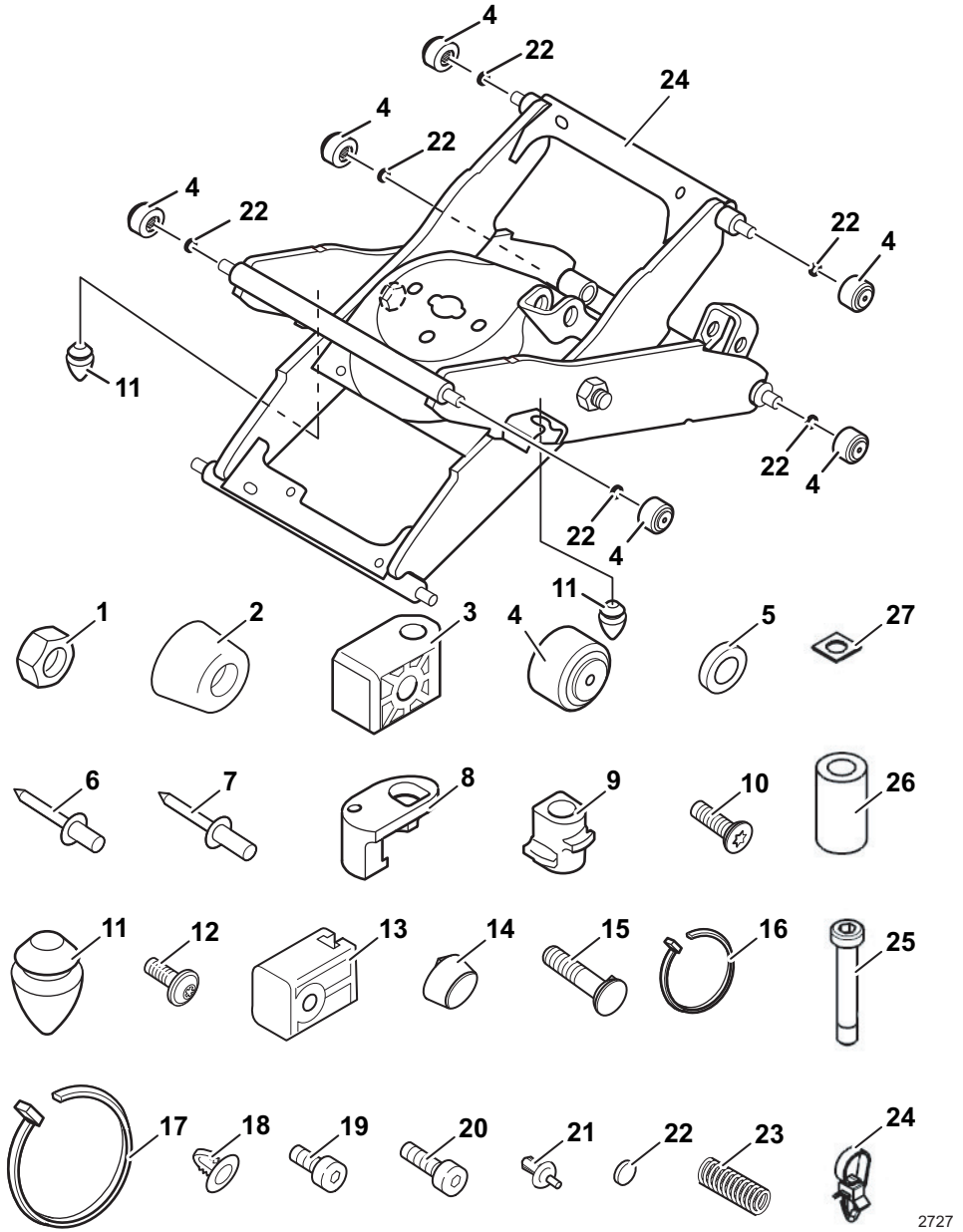
15 Remove buffer (14) (see Chapter 3.23)

16 Remove countersunk screw (15) (see chapter 3.23).

17 Remove cable ties, 3.6 x 200 (16) (see Chapter 3.15 and 3.21).

18 Remove cable tie, 7.6 x 387 (17) (see Chapter 3.12).

19 Remove bellows pin (18) (see Chapter 3.4)



3.25 Worn parts – replacement

20 Cap screw, M8 x 12 (19) (see Chapter 3.1).
Installation note:
Cap screw (19), 25 Nm.

21 Cap screw, M8 x 16 (20) (see Chapter 3.1).
Installation note:
Cap screw (20), 25 Nm.

22 Remove expanding rivet (21) (see Chapter 3.3)

23 Remove rollers (4) from the axles of the swinging structure (24) (see Chapter 3.22 and 3.23).

24 If necessary, push clearance spacers (22) to the axles of the swinging structure.

25 Remove compression spring (23) (see Chapter 3.6)

26 Remove push mount ties with wings, (24) (see Chapter 3.15 and 3.21).

27 Remove cap screw (25), socket (26) and plate (27) (see Chapter 3.1).

28 Re-install the components in the reverse order of their removal.
Note:
If the swinging structure (24) is defective, the complete seat suspension is to be replaced.