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About this manual

This repair manual contains information and instructions for performing repair work on the GRAMMER seat MSG45 with seat top 421.

The seat MSG45 with seat top 421 forms the basis of the illustration in the repair manual. Any differences resulting from technical deviations in the work steps (due to any seat design variations) are described in the text or in separate chapters.

All preparations to be made before starting work are listed at the beginning of each chapter. These tasks are described in their own chapters and are carried out without any of the preparations which may be listed there.

Within each chapter of this repair manual, all parts shown in the images are numbered starting with "1". Each part is addressed within the chapter with the same item number.

Only the item numbers in the valid spare parts catalogues can be used for spare parts orders.

The work is described for the dismantled seat. If the installation situation allows it, some work can also be carried out on an installed seat. For this reason, the surroundings of the installed seat must first be investigated for this option before work is started. The safety specifications of the vehicle manufacturer and those in Chapter 1 of this repair manual must always be complied with.

Any delivery variants requiring an explanation are also described in this repair manual. Since the scope of delivery is based on the customer’s order, certain descriptions and illustrations of the seat fittings can differ.

The repair work is presented based on the seat for left-hand drive. The different tasks must be carried out in a mirror image for repairs on vehicle designs with right-hand drive.

If not otherwise indicated in the text, the directional information "front, back" and "right, left" refer to the installed seat and the vehicle’s direction of travel.

The layout has been developed in a way that makes it possible to later offer the repair manual in the form of a CD-ROM/INTERNET/INTRANET.

General information on the seat!

Please contact the manufacturer about any assembly work required for the removal and installation of the seat in the vehicle.

The seat has long-term lubrication (around 10 years). The lubrication points may only be regreased with lubrication grease KFHC2N-50 DIN 51825 following repair work on the points marked by (F) in the repair manual.

It is possible that not all fasteners are mentioned in this repair manual. It may be necessary upon completion of the repair work that fasteners be inspected with regard to their factory installation and their hold and tightness, and corrected accordingly if needed.
Foreword

Bowden cables, cables, and hoses may only be secured by hand (therefore loose) using cable ties in the specified locations. You must ensure that the Bowden cables, cables and hoses are not pinched when adjusting the seat vertically and horizontally, and that they follow the movement of the seat without causing tension.

All removed used parts must be replaced by the new parts supplied. If no corresponding new part is included in the spare parts scope of delivery for existing old parts, then they must be cleaned and inspected for further use. The defective parts and wear parts must be replaced.

GRAMMER AG will reject any warranty claims if damaged or worn parts and assemblies are not replaced by spare parts approved by GRAMMER.

Qualified personnel

The instructions represent the basis for proper and professional repair. The content of the described work steps builds on the training status of a technician with a completed vocational education and good knowledge of the product. This level of knowledge is essential for performing the work described.

All information and instructions, especially the safety information in Chapter 1, must be carefully read and followed completely, in order to prevent physical injury, impairment of the operational safety of the seat, or damage to the seat as a result of improper work.

It is ultimately impossible for GRAMMER AG to evaluate all situations which could pose a risk of injury to the person involved. It is therefore absolutely necessary that everyone performing repair work on the seat apply their expert knowledge to ensure that their own safety is not jeopardised and that the seat is not negatively impacted by the type of repair work selected, especially in regards to safety. For these reasons, no liability can be assumed for such damage.

We also point out explicitly that all of the work steps described must only be carried out in compliance with all directives and requirements of the responsible authorities and of the health, accident and environmental protection regulations.

Right of modification and copyright

These seats are constantly being further developed. Please understand that we must reserve the right to make changes to its form, equipment, and technology. For these reasons, no claims can be derived from the content of this repair manual. Reprinting, translation and reproduction, even as excerpts without our written consent are prohibited.

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1 Description

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1.1 Safety Instructions
1.2 Nameplate

Note:
Please refer to the currently valid seat operating manual for additional descriptions.
1.1 Safety information

1 Inspect and repair work may only be performed by specially trained personnel.

2 All of the work steps described must only be carried out in compliance with all directives and requirements of the responsible authorities and of the health, accident and environmental protection regulations.

3 Special instructions in the repair manual are highlighted as follows:

⚠️ CAUTION…
indicates a possible danger to persons and how to avoid it.

⚠️ ATTENTION …
indicates possible material damage or destruction and how to avoid it.

Note: …
indicates an additional explanation for understanding the work to be performed.

Installation instruction: ...
indicates an additional explanation for understanding the installation work to be performed.

4 The following steps must be carried out before starting any repair work:
   • Disconnect the seat from the power supply.
   • In the lower position, move the seat until it meets the end stops.

5 When handling oils, greases and other chemical substances, the product safety requirements must be observed.
1.2 Nameplate

The nameplate is mounted on the rear left of the back plate.

The nameplate includes the following data (for example):

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

(B) **NAME** = MSG45/421

(C) **MATERIAL NO.** = 1319189

(D) **Year / CW / assembly group**
   18 10 141:
   - Year of construction = 18 (2018)
   - Constructed in week = 10 (March)
   - Assembly group = 141

(E) **ORDER NO.** = XX
   133448970001
   - Country code = XX

**Note:**
The correct MATERIAL NO. (C) on the nameplate must always be specified when placing orders.
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- Seat switch installation overview  
- Seat switch and pin assignment with circuit diagram  

2.2 Fault overview – Identifying potential faults which may occur  

2.3 Troubleshooting – Locating the fault  
   1. Checking the seat switch
2.1 Component overview

Seat switch installation overview

(1) Seat switch cable harness
(2) Cable tie with plug-in anchor
(3) On-board power supply connector
(4) Blind rivet
(5) Pressure spring
(6) Bushing
(7) Switch bracket
(8) Cable ties
(9) Seat switch
(10) Cover
(11) Switch plate
(12) Blind rivet
2.1 Component overview

Seat switch and pin assignment with circuit diagram

(1) Seat switch cable harness
(3) On-board power supply connector
(9) Seat switch
(13) Seat switch lifter
(14) Assignment as normally open contact (Z) (Pin: P1 and P2)

(X) Line end. The line is not laid up to the on-board power supply connector (3).
(Z) The seat switch (9) is closed when the seat is compressed. The vehicle can be put into operation.

Note:
Distance (A) between the rest position and switching point of the seat switch lifter (13) = 1,2 mm.
2.2 Fault overview – Identifying potential faults

This Chapter contains information about faults which may occur in the seat. This information should serve to resolve the fault, with the help of Chapter 2.3 "Troubleshooting – Locating the fault".

Faults caused by lack of maintenance or incorrect repairs are not taken into account.

**Note:** The relevant components are listed in Chapter 2.1 and the components to operate the functions are listed in the current seat repair manual, unless otherwise stated in the text.

<table>
<thead>
<tr>
<th>Fault description</th>
<th>Possible cause</th>
<th>Eliminating the fault</th>
</tr>
</thead>
</table>
| The seat switch does not make contact when the seat cushion is compressed. | • The switch bracket has come loose from the spring assembly.  
• The switch bracket is not resting on the pressure springs.  
• The pressure springs have come loose from the bushings.  
• Bellows are trapped between the seat cushion and spring assembly.  
• Seat switch lifter is defective.  
• The spring sheet broken or bent. | Insert the switch bracket in the spring assembly (see Chapter 3.8).  
Place the switch bracket on the pressure springs (see Chapter 3.8).  
Insert the pressure springs in the bushings (see Chapter 3.8).  
Run your hand between the bellows and seat cushion to release the tension. Remove/install the seat cushion if necessary (Chap. 3.2).  
Replace the seat switch with cable (see Chapter 3.8).  
Replace the seat switch with cable and switch actuation (Chap. 3.8). |
| Seat switch is not functioning. | • Vehicle power supply or electronics are defective.  
• Plug connection (on-board power supply connector of seat - vehicle) is defective.  
• Seat switch is defective. | Check the electrical system of the vehicle.  
Check the plug connection, remake if necessary.  
Check the seat switch (Chap. 2.3, Test step 1.1), completely replace the seat switch if necessary (see Chapter 3.8). |
# 2.3 Troubleshooting – Locating the fault

## 1 Checking the seat switch

### Prerequisites for troubleshooting:
- Electrical system of the vehicle has been checked and is in order.
- Overview of the relevant components, see Chap. 2.1.

### Test/operate

<table>
<thead>
<tr>
<th>Test step</th>
<th>Test/operate</th>
<th>Result/objective</th>
<th>Fault elimination</th>
</tr>
</thead>
</table>
| 1.1       | • Disconnect the plug connection (on-board power supply connector (3) of seat - vehicle).  
           | • Measure the resistance at Pins P1 and P2:                                      | **Measurement note:** Seat switch is open.                                               | Continue with test step 1.2.                |
|           | P1  Ω  P2                                                                     | >> 0.7 Ω (→ ∞)                                                                   | Replace the seat switch with cable (see Chapter 3.8).                                   |
|           |                                                                 | << 0.7 Ω (→ 0) (short circuit)                                                 |                                              |
| 1.2       | • Compress the seat cushion and measure the resistance at Pins P1 and P2:      | **Measurement note:** Seat switch is closed.                                       | End of test.                               |
|           | P1  Ω  P2                                                                     | ≥ 0.7 Ω (± 20%)                                                                  | Replace the seat switch with cable (see Chapter 3.8).                                   |
|           |                                                                 | >> 0.7 Ω (→ ∞) (interruption) or                                               |                                              |
|           |                                                                 | << 0.7 Ω (→ 0) (short circuit)                                                 |                                              |
3 Repair work

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3.10 Removing/installing the linkage of the weight display
3.11 Removing/installing the end stop (buffer)
3.1 Removing/installing backrest cushion

Removal, installation

1. Open the document box.

2. Unscrew the seven cup head screws (3).
   **Installation instruction:**
   Cup head screw (3), 3.5 ± 0.5 Nm.

3. **CAUTION** danger of injury caused by the back plate (2) jerking forward!
   If the backrest cushion (1) has been removed, the back plate (2) must be supported when activating the handle for backrest angle adjustment.

4. Remove the backrest cushion (1) from the back plate (2).

5. Installation is carried out in reverse order.
3.2 Removing/installing seat cushion

Removal

1. Engage the backrest (3) in the foremost position.

2. Unhook the seat cushion (1) from the spring assembly (5). To do this, first pull the snap lock grip (2) backwards and then upwards.

3. Grasp the seat cushion (1) with both hands at the front left and right, press downwards and remove by pulling it out forwards.

Installation

1. Place the seat cushion (1) on the spring assembly (5). The two holders (6) at the bottom of the seat cushion (1) must be level with the hooks (4) on the spring assembly (5).

   Note:
   If a seat switch is provided, ensure that the pressure springs and the switch bracket are correctly seated when installing the seat cushion (1) to guarantee the proper functioning of the seat switch (see Chapter 3.8).

2. Press the seat cushion (1) down at the front left and right and push it backwards onto the two hooks (4) with the two holders (6).

3. Press down on the seat cushion (1) at the rear centre until the snap lock grip (2) engages.

   Note:
   Check the function of the seat switch: Press the front of the seat cushion (1) several times at the left and right to check whether the seat switch makes audible contact (see Chapter 3.8).
3.3 Removing/installing left and right cover

Removal, installation

1. Remove the seat cushion (Chap. 3.2).

2. Remove the lap belt and buckle (Chap. 3.6).

3. Unclip two front (2) and rear (3) snap-in hooks on the right-hand cover (1) from the indents (6 and 4) on the right-hand backrest holder (5) and remove the cover (1).

4. Unclip two front (9) and rear (10) snap-in hooks on the left-hand cover (8) from the indents (13 and 11) on the left-hand backrest holder (12) and remove the cover (8).

5. **Replacing the right cover (1) or left cover (8):**
   Break out the predetermined perforated breaking points (A, B) for the holders (7) and the lap belt and buckle on the cover (1, 8) as required.

6. Installation is carried out in reverse order.
3.4 Removing/installing back plate with backrest bearing completely

Removal, installation

1. Remove the backrest cushion (Chap. 3.1).
2. Remove the seat cushion (Chap. 3.2).
3. Remove the lap belt and buckle (Chap. 3.6).
4. Remove the right-hand and left-hand cover (Chap. 3.3).
5. Unscrew the right-hand and left-hand flange nut (2).
   **Installation instruction:**
   Flange nuts (2), 25 ± 5 Nm.
6. Unscrew the right-hand and left-hand socket head screw (4) and remove the right-hand (1) and left-hand holder (3) from the seat.
   **Installation instruction:**
   Socket head screws (4), 25 ± 5 Nm.
3.4 Removing/installing back plate with backrest bearing completely

7 Fold the back plate (1) completely forwards to release the return spring (6).

8 Unscrew two flange bolts (3) and remove the flange nuts (5).
   **Installation instruction:**
   Flange nuts (5), 25 Nm.

9 Support the backrest plate (1) and press two bushings (2) inwards out of the left-hand (4) and right-hand (7) backrest holder.
   **Installation instruction:**
   When attaching the back plate (1), make sure that the cam (arrow) is above the hook of the return spring (6).

10 Unhook the backrest plate (1) upwards, remove the bushings (2) and return spring (6).
   **Installation instructions:**
   ● Grease the entire circumference (F) of the bushings (2) and the outer surfaces (F) of the return spring (6).
   ● Place the return spring (6) on the three punched lugs on the backrest holder (7). The hook of the return spring (6) must point backwards.

11 Installation is carried out in reverse order.
3.5 Removing/installing the bellows

Removal, installation

1. Remove the seat cushion (Chap. 3.2).
2. Remove the lap belt and buckle (Chap. 3.6).
3. Remove the cover (Chap. 3.3) on the right and left.
4. Remove the right-hand and left-hand holder (see Chapter 3.4).

**CAUTION** Damage!
Do not tear off the mushroom knobs (4) during removal.
Stretch the mushroom knobs somewhat lengthwise and use two screwdrivers to lift them out on the thicker end (arrow).

**Installation instructions:**
Insert the mandrel (Ø approx. 3 mm) into the mushroom knob (4) through the outside opening provided for this purpose (1) and carefully draw the bellows (1) against the mandrel.
Press the mushroom knob (4) stretched in this way into the corresponding hole.

5. Removing the bellows (1) from the upper suspension component:
   - Lever out 2 mushroom knobs (4).
   - Unhook 6 keyhole knobs (2 and 3).
   - Unhook 2 bellows brackets (5) from the rear hooks.
   - Unhook 6 bellows cut-outs (8) from the front six hooks.
   - Pull out 2 cable ties with a plug-in anchor (6) from the upper suspension component and bellows (1).

6. Removing the bellows (1) from the lower suspension component:
   Unhook 5 keyhole knobs (7).

7. Pull the bellows (1) down over the lower suspension component and remove.

8. Installation is carried out in reverse order.
3.6 Removing/installing lap belt and buckle

Removal, installation

1. Remove the seat cushion (Chap. 3.2).

2. Unscrew the hexagon nut (2).
   **Installation instruction:**
   Hexagon nut (2), 50 Nm.

3. Pull the buckle (1) and short (3) and long (4) bushings off the hexagon bolt (5).

4. Unscrew the hexagon nut (9).
   **Installation instruction:**
   Hexagon nut (9), 50 Nm.

5. Pull the lap belt (10) and short (8) and long (7) bushings off the hexagon bolt (6).

6. Remove two hexagon head bolts (5 and 6).

7. Installation is carried out in reverse order.
3.7 Removing/installing the seat length adjustment completely

Removal, installation

1. Unhook the bellows from the lower suspension component (1), push upwards and fix (see Chapter 3.5).

2. Pull the snap-on rail (7) and rail (5) off the adjusting rail (4) and completely remove the adjusting rail (9).

   **Note:**
   Push the handle for fore/aft adjustment (8) to the right to disengage the snap-on rail (7) completely from the adjusting rail (9).

   **Installation instruction:**
   Grease the rail running surfaces (F).

3. Mark the complete installation position of the adjusting rail (4) and adjusting rail (9).

4. Unscrew four socket head screws (2) and completely remove the flange nuts (6), spacers (3) with adjusting rail (4) and adjusting rail (9).

   **Installation instructions:**
   ● Completely install adjusting rail (4) and adjusting rail (9) according to the marking.
   ● Socket head screws (2), 25 Nm.

5. Installation is carried out in reverse order.
3.8 Removing/installing seat switch with cable and switch actuation

Removal, installation

1. Remove the seat cushion (Chap. 3.2).

2. Unhook the bellows from the upper suspension component (12) and lay it down (see Chapter 3.5).

3. Unhook the switch bracket (5) from the upper suspension component (12).

**Installation instruction:**
The switch bracket (5) must rest on the two pressure springs (3) to guarantee the switching function of the seat switch (7).

4. **If the bushing (4) is defective:**
   4.1. Remove two pressure springs (3) upwards from the two bushings (4).
   4.2. Drill out two rivet heads, knock out the blind rivet (2) and remove two bushings (4).

5. **If the switch plate (9) is defective:**
   Drill out the rivet head and knock out the blind rivet (10). Remove the switch plate (9).

6. Press the snap-in hook (arrow) on the housing seat level indicator (11) downwards, push the cover (8) forward over the snap-in hook and remove the cover (8) upwards.

7. Pull out the seat switch (7) on the housing seat level indicator (11) and place on the upper suspension component (12).

8. Mark the places where the cable (1) is attached to the upper suspension component (12) and remove five cable ties (6).

9. Remove the seat switch (7) with cable (1) from the upper suspension component (12).

10. Installation is carried out in reverse order.
3.9 Removing/installing the backrest adjustment completely

Removal, installation

1. Remove the seat cushion (Chap. 3.2).

2. Remove the left lap belt (see Chapter 3.6).

3. Remove the left cover (see Chapter 3.3).

4. Unlock the backrest and fold it completely forwards.

5. Unscrew the flange bolt (2) and remove the flange nut (7).

6. Remove the profile plate (6).

   **Installation instructions:**
   - Grease the entire inner surface (F) of the profile plate (6).
   - The control flag (arrow) on the profile plate (6) must point to the backrest holder on the left (1).

7. Pull the control lever (3) with handle for backrest angle adjustment (4) out of the left-hand backrest holder (1).

8. Installation is carried out in reverse order.
3.10 Removing/installing the linkage of the weight display

Removal, installation

1 Remove the seat cushion (Chap. 3.2).

2 Remove the bellows at the front, right and left of the upper suspension component and press down (see Chapter 3.5).

3 Mark the installation location of the linkage (1).

4 Unhook the linkage (1) from the lower suspension component (4).

5 Unclip the linkage (1) on the holder (5) of the housing seat level indicator (2) and remove.

Installation instructions:
- Install the linkage (1) as marked.
- When mounting, ensure that the upper end of the linkage (1) engages in the longitudinal guide (arrow) of the pointer (3).

6 Installation is carried out in reverse order.
3.11 Removing/installing the end stop (buffer)

Removal, installation

1. Unhook the bellows on the rear of the lower suspension component (1), push upwards and fix (see Chapter 3.5).

2. Press the end stop (2) out of the lower suspension component (1).

3. Installation is carried out in reverse order.