FITTING INSTRUCTIONS

making everyday smoother

airsuspension

• Increased comfort • Better driveability • More safety

VOLKSWAGEN CADDY

Short wheelbase

with VB-FullAir 2-Corner rear axle air suspension

FOR KIT 105 09 09 20X

What's changed?

New version number:	1.2		
Release date:	10/12/2012		
Changed compared to	V1.1		

Page: (New version)	**Changes**
5	Calibration support heights added
11	Bolt for heightsensor changed
11	Description of heat shield added
12	Mounting the right air spring with heat shield added
13	Information about fasteners when towbar present
13	Mounting under bumper on page 13 in stead of 14
14	Remark over black corrugated hose
15	Remark about vehicles with control unit for batterymonitoring
16	Tip for guiding the connectors into the vehicle
16	Handbrake connection added
17	Speed signal connection updated

Contents

1. Safety regulations

Personal safety regulations

- Always wear appropriate safety clothes and safety shoes.
- Do not wear any rings, watches, or free hanging clothes.
- Never keep any loose goods in pockets of clothes.
- Bind long hair together.
- Never use defect tools. Use tools only for the purpose where it is meant for.
- Wear safety goggles.

General safety regulations

- Always use a car lift to perform the operations.
- Be sure the vehicle is always supported properly when necessary.
- Be sure the vehicle can not roll away.
- Incapable fitting operations may result in dangerous situations.

Used Symbols

Attention

	***When the warning symbol is displayed, information of great importance to the safety and / or health of the involved persons is provided. This symbol is also used in operations that are crucial for the correct mounting of the air suspension set.***

Tip

	***When the tip symbol is displayed, advice is given to make the mounting of the air suspension set more easy.***

Torque

 ***xx Nm***	***Every bolted joint in this manual comes with a torque.***

2. General fitting regulations

This manual has been carefully crafted to provide the best way to fit the air suspension mentioned on the cover of this manual. However, the manual is a random indication of the technical specifications at any given time.
VB-Airsuspension reserves the right to make technical changes in the air suspension kit without any notification.

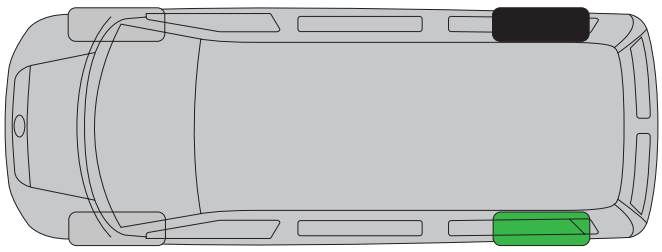
Fitting of the air suspension kit can only be done in a from VB-Airsuspension authorised workshop. The fitting can only be done by authorised mechanics. The mechanics must have proper experience in electric/electronics, pneumatics and regular vehicle technics.

- When necessary, use the work-shop manuals of the vehicle.
- Always follow the directions of the vehicle manufacturer, unless otherwise expressly stated in this manual.
- Work clean.
- Always tighten the bolts and nuts according the recommended torque.
- Whenever changes are made to the original corrosion protection, restore it immediately. For this purpose use for example protective coating or spray wax.
- Always re-fit the removed wires and tubes on the original way.
- Always secure the wires and air tubes with plenty of tie-wraps. Secure all connectors properly and make sure that there is no stress on them.
- All electrical cables must be kept at least 100 mm away from the ABS/ESP block, its sensors and other controllers.
- Make sure the air-tubes do not make sharp corners and can not bend or wear against other parts.
- Connecting electrical cables or air-tubes to brake lines is strictly prohibited!
- Make sure no tools, cleaning rags or other materials remain under the car.
- Check the air suspension after finishing the fitting according the checklist.
- Check after the fitting, the system for air leakage.
- When finishing the fitting, always make a test drive.
- Make sure that the right calibration support are available, for this kit the right calibration support are:

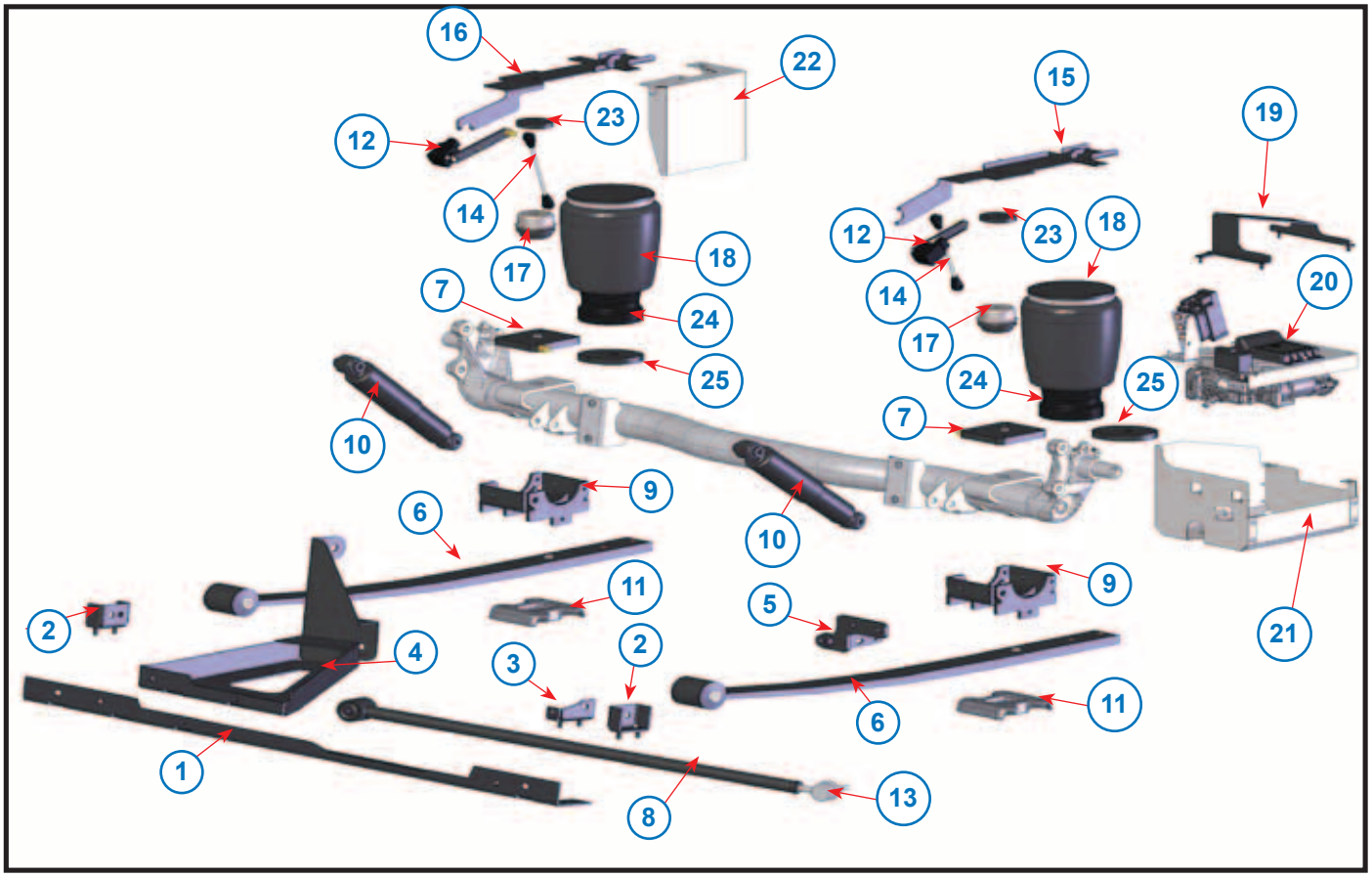
Axle	Calibration height:	Partnumbers:
Rear axle	**X = 285mm**	009 000 00 57

- The air-suspension is split up in two corners, which correspond to one corner of the vehicle. When a part is specific for one corner, this will be marked with a coloured sticker.

Colour	Description
Green	*Left rear*
Black	***Right rear***



3. Overview of the air-suspension kit



The air-suspension kit consists of numerous different parts. To keep things clear, only the main parts have been included on the above picture. The more common parts, like for example the fitting materials, have been left out.

Number	Description
1	Cross beam
2	Leaf spring bracket
3	Leaf spring bracket
4	Panhardrod bracket
5	Panhardrod ball joint bracket
6	Main spring
7	Upper clamping plate
8	Panhardrod
9	Lower clamping plate
10	Shock absorber
11	Clamping plate (original)
12	Heightsensor
13	Panhardrod ball joint
14	Heightsensor rod

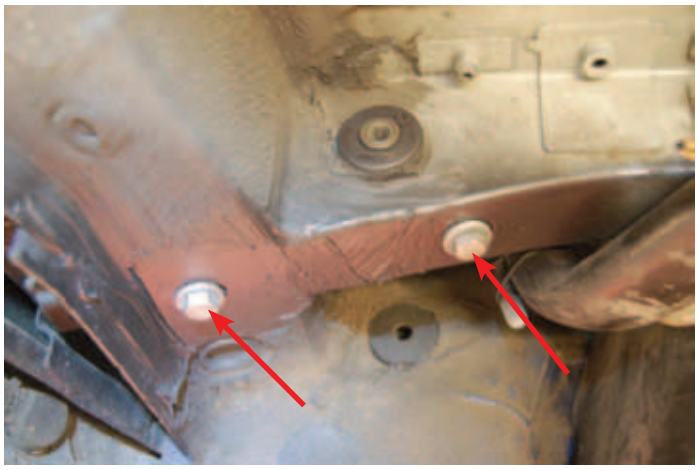
Number	Description
15	Upper air spring bracket left
16	Upper air spring bracket right
17	Bump stop
18	Air spring
19	Compressorbox bracket
20	Compressorbox
21	Compressorbox protection cover
22	Heat shield
23	Distance washer
24	Piston
25	Filling plate

For an overview of the place where the different parts are located, please see the chapter “Exploded View” in chapter 8. You can also find the partnumbers there.

4. Mounting the air spring system

4.1 Preparations

1. Support the vehicle properly.
2. Remove the spare wheel.
3. When the vehicle has a towbar, please continue with point 5.
4. Remove the rear bumper and the under bumper.
5. Remove the shock absorbers, the bolts and nuts will be re-used.
6. Remove the U-bolts.
7. Remove the rear leaf spring bracket bolts.
8. Remove the front leaf spring bracket bolts.
9. Remove the leaf springs.
10. Remove the rear leaf spring brackets.
11. Remove the bump stops.
12. Remove the two bolts (see picture) of the towbar(if present) on the left side of the vehicle.
13. Remove the rear part of the heat shield, the original fasteners will be re-used.



4.2 Mounting the air spring system

4.2.1 Cross beam, main springs and panhardrod

1. Place the bolts without nuts in the holes of the front leaf spring bracket.

60 Nm	***2 x Bolt M10x30 10.9**** ***2 x Lock nut M10*** ***4 x Washer M10***

2. Mount cable ties in the holes of the cross beam.
3. Mount the cross beam between the front leaf spring brackets but only mount it with the bolts and nuts who have been placed in step 1.
   Don't secure the bolts yet.

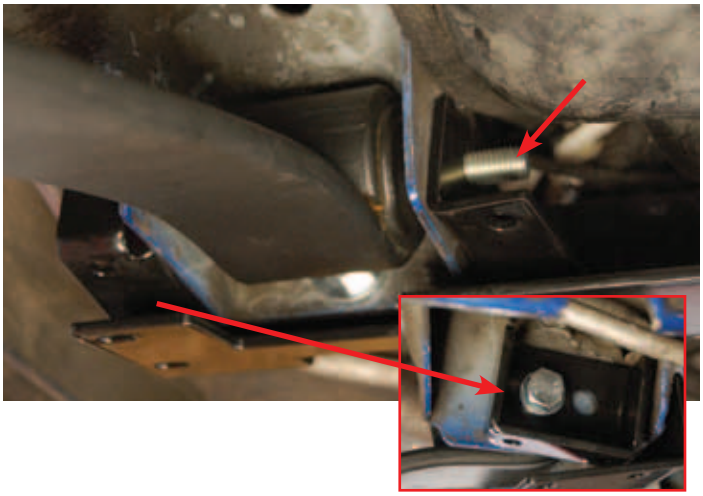
4. Mount the outer and inner brackets together with the main spring in the leaf spring bracket.
Don't secure the bolts yet.

Left:

110 Nm	***1 x Bolt M12x120 10.9**** ***1 x Lock nut M12*** ***2 x Washer M12***

Right:

110 Nm	***1 x Bolt M12x140 10.9**** ***1 x Lock nut M12*** ***2 x Washer M12***

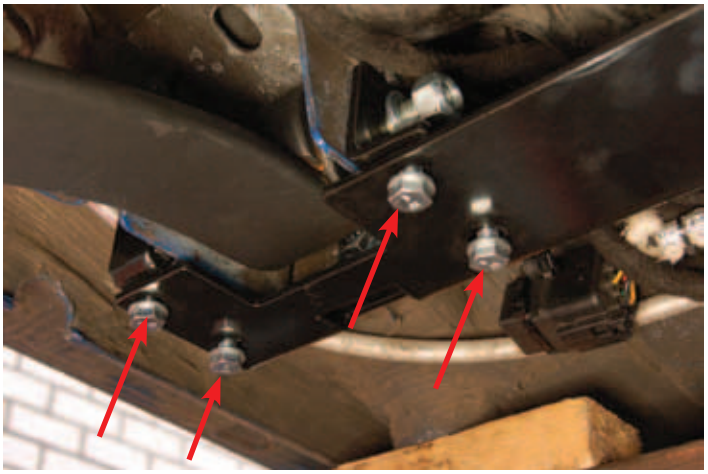


5. Mount the inner brackets to the cross beam.
Don't secure the bolts yet.

20 Nm	***1 x Bolt M8x20 8.8**** ***1 x Lock nut M8*** ***2 x Washer M8***

6. Mount the left brackets to the cross beam.
Don't secure the bolts yet.

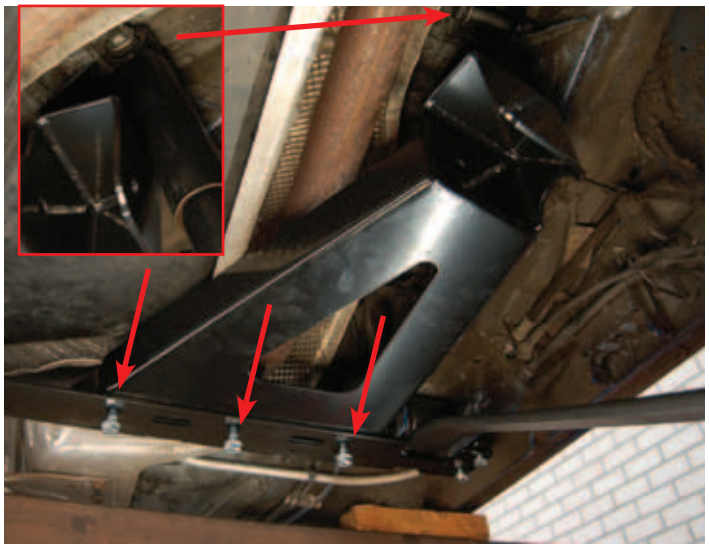
20 Nm	***6 x Bolt M8x25 8.8**** ***6 x Lock nut M8*** ***12 x Washer M8***



7. Mount the panhardrod bracket to the cross beam and to the upper mounting point of the right shock absorber.
Don't secure the bolts yet.

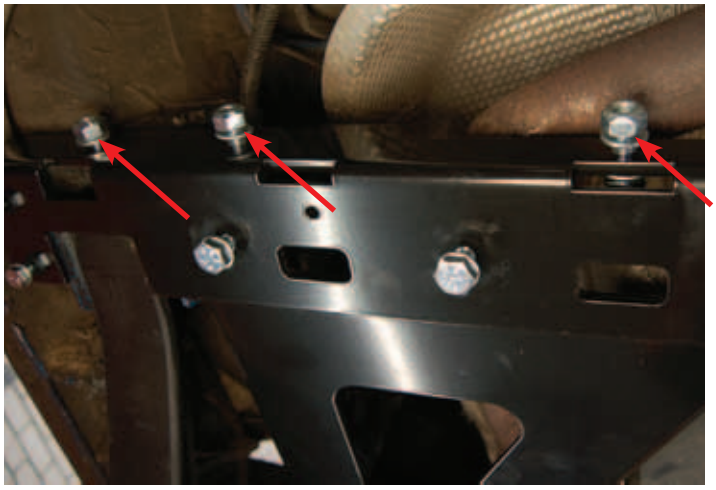
	Use sealant to secure the bolts.

60 Nm	***2 x Bout M12x90*** ***4 x Sluitring M12*** ***2 x Borgmoer M12***
100 Nm	***2 x Bout M12x90*** ***4 x Sluitring M12*** ***2 x Borgmoer M12***



8. Mount the panhardrod bracket to the cross beam with the three bolts as shown in the picture. ***Don't secure the bolts yet.***

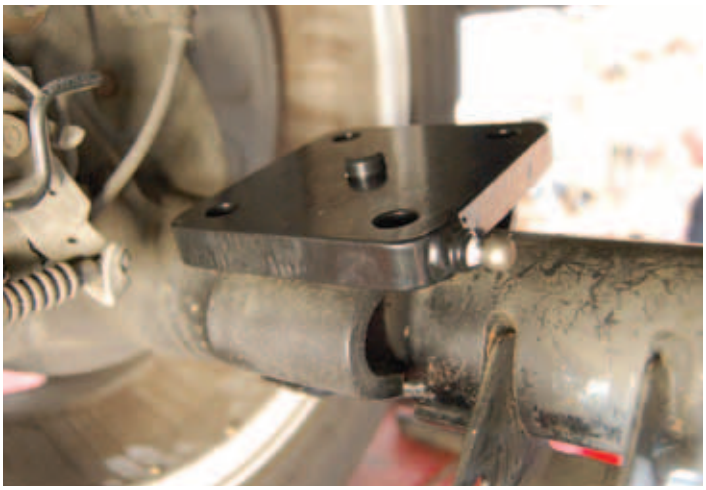
60 Nm	***2 x Bolt M10x30 10.9** **2 x Lock nut M10** **4 x Washer M10***



9. Mount the left shock absorber but only with the upper bolt. ***Don't secure the bolts yet.***

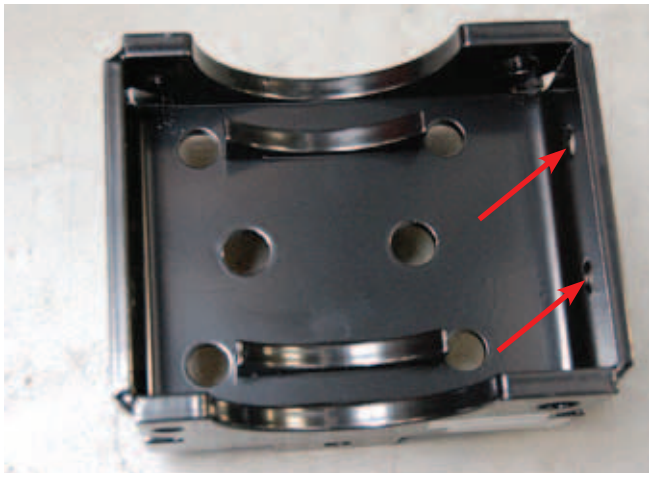
Use sealant to secure the bolts.

100 Nm	***2 x Original bolt****



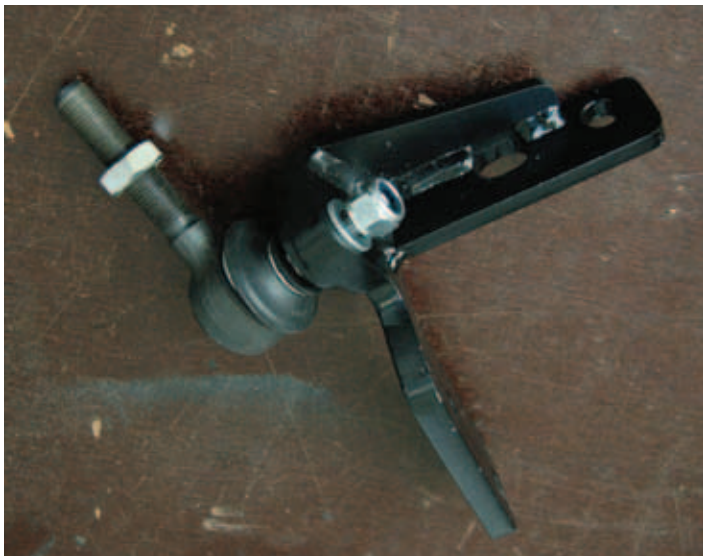
10. Place the upper clamping plate on top of the axle, be sure that the ball joint pointing to the inner and front side of the vehicle.

11. Be sure that the lower clamping plates gets mounted with the two threaded holes facing the front side of the vehicle.



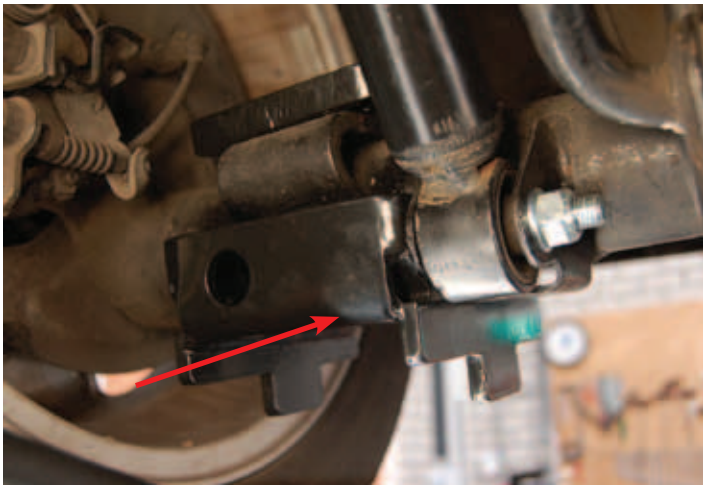
12. Mount the panhardrod ball joint to the panhardrod ball joint bracket.

60 Nm	***1 x Lock nut M10** **1 x Washer M10***



13. Place the bolt already through the hole of the lower clamping plate.
14. Mount the lower clamping plates together with the shock absorbers to the vehicle. ***Don't secure the bolt yet.***

110 Nm	***2 x Bolt M12x80 10.9**** ***2 x Lock nut M12*** ***4 x Washer M12***

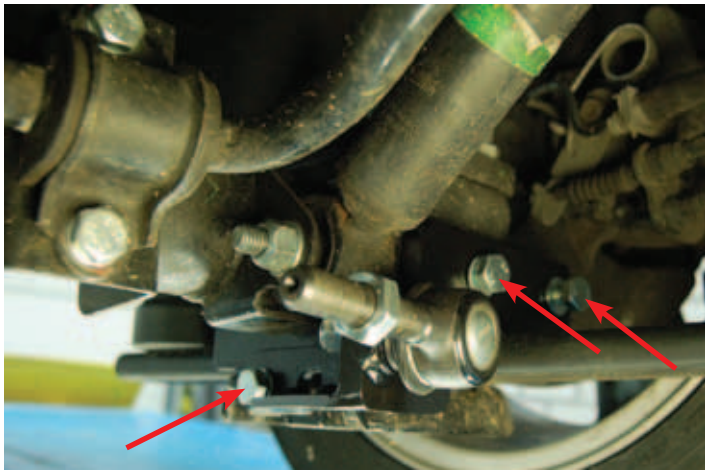


15. Mount the original clamping plates. ***Don't secure the bolts yet.***

110 Nm	***8 x Bolt M12x160 10.9**** ***8 x Lock nut M12*** ***16 x Washer M12***

16. Mount the panhardrod ball joint bracket to the left lower clamping plate.

60 Nm	***3 x Bolt M10x25 10.9*** ***3 x Washer M10***



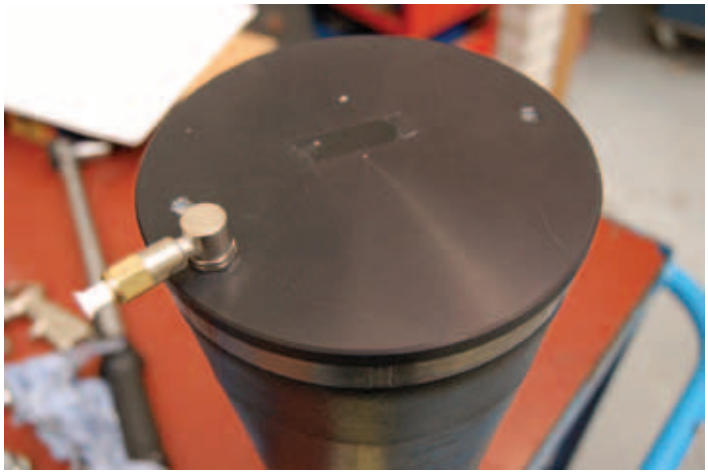
17. Mount the panhardrod to the panhardrod ball joint. ***Don't secure the nut yet.***

18. Mount the panhardrod to the panhardrod bracket. ***Don't secure the bolt yet.***

110 Nm	***1 x Bolt M12x90 10.9**** ***1 x Lock nut M12*** ***2 x Washer M12***

4.2.2 Air springs

1. Mount the air couplers to the air springs.



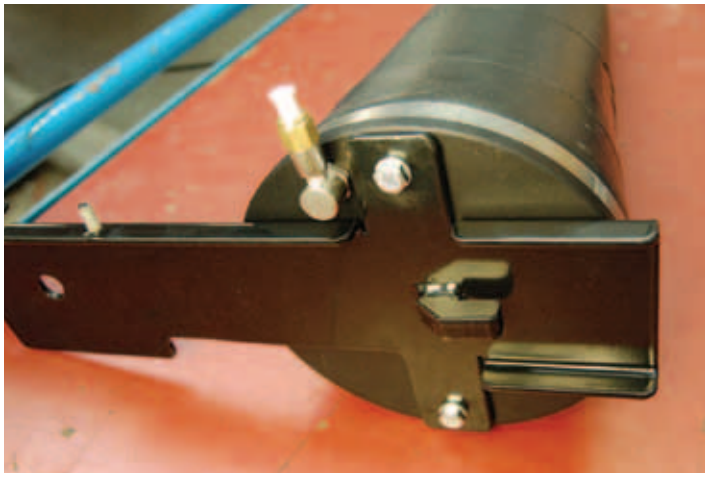
2. Mount the heightsensors to the upper spring brackets. Pay attention to the position of the heightsensor (see right image)

5 Nm	***4 x Bolt M5x10 8.8*** ***4 x Washer M5***

	See the top view for the position of the heightsensor.

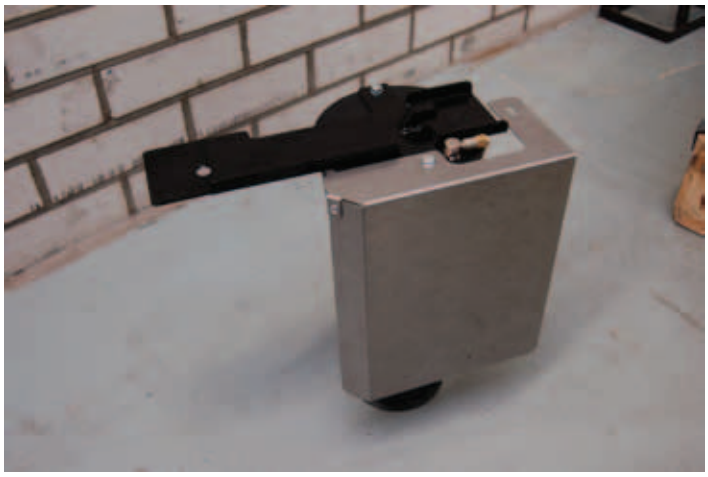
3. Mount the upper spring bracket to the air springs.

6 Nm	***2 x Bolt M6x12 8.8*** ***2 x Washer M6***



4. Mount the heat shield to the right air spring.

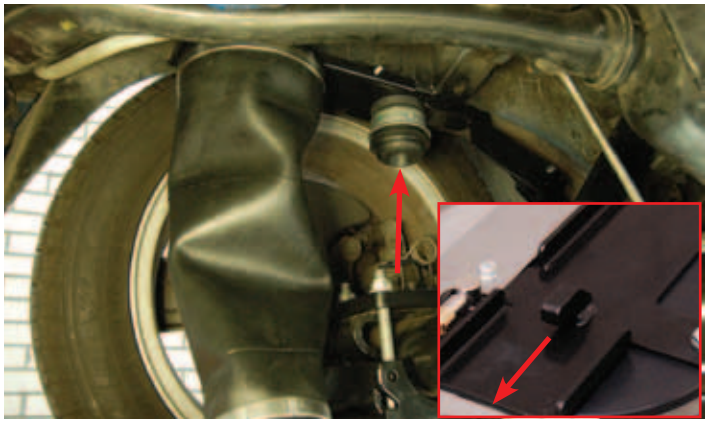
6 Nm	***2 x Bolt M6x12 8.8*** ***2 x Washer M6***



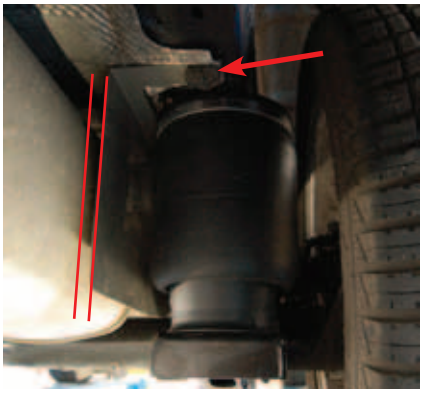
5. Slide the upper spring bracket in the hole in the chassis.
6. Mount the bump stop with the distance washer.

60 Nm	***2 x Flare bolt M10x55 10.9***

The air couplers have to point to the innerside of the vehicle.

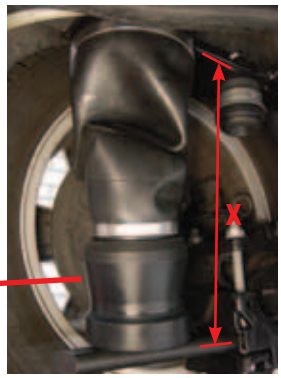


7. Mount the heat shield under the original fasteners of the original heat shield.
8. Bend the exhaust so the exhaust and heat shield can´t make contact.



9. Mount the air spring with the piston to the main spring. Mount the filling plate between the piston and main spring.
Use the front holes of the main springs.
Don't secure the bolts yet.

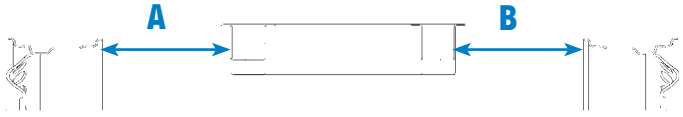
20 Nm	***2 x Bolt M10x100****



10. Pump with a extern air supply air in the air spring. Pump as many that the X dimension is right. X= between the main spring and the upper air spring bracket.

For an overview of the right calibration supports for this kit, please see chapter 2.

11. Secure the bolts of the cross beam and leaf spring bracket with the specific torque.
12. Secure the lower bolts of the shock absorber.
13. Measure the distance ***(A)*** between the chassis and the rim edge on the left-hand side. Measure the distance ***(B)*** between the chassis and the rim edge on the right-hand side. If the distance between left and right is more than 2 mm, loosen the lock nut and remove the panhard rod bolt.
14. Turn the panhard rod:
- Left: when A < B
- Right: when A > B
Size difference > 2mm, Adjust!
Size difference < 2mm, Go further!
15. Secure the lock nut.



A = B ± 2 mm

By rotating the panhard rod 1 turn, the adjustment of the displacement is 1.5 mm

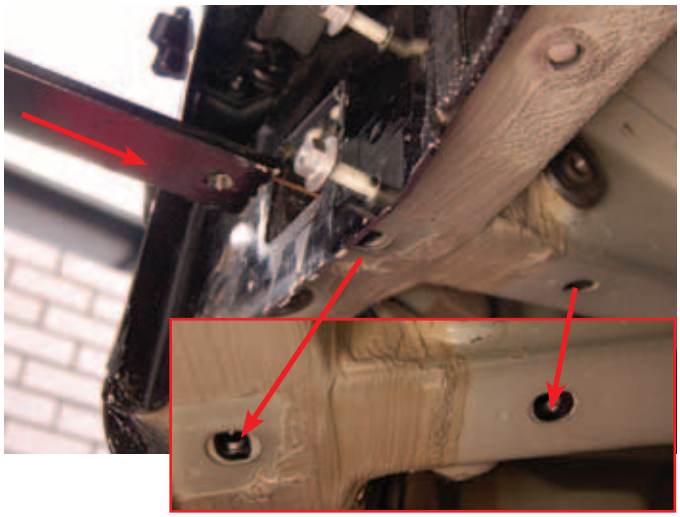
16. Check the length of the heightsensor rods.
    - **170 mm** measured from heart to heart.
17. Mount the height sensor rods to the height sensors.
18. Mount the height sensor rods to the ball-joints brackets.

⚠	***The height sensor arm must be pointing to the back of the vehicle!***

4.2.3 Compressorbox

⚠	***When the vehicle has a towbar, please mount the towbar and continue with step 2.***

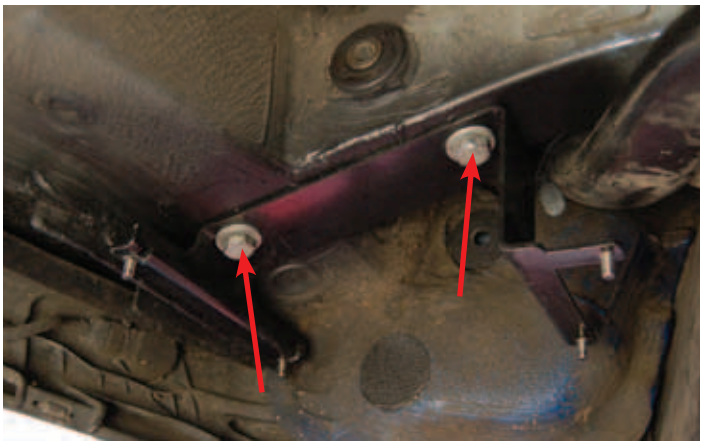
1. Slide the clamping plates in to the chassis from the rear side untill the holes match with the holes of the vehicle.



2. Mount the compressorbox bracket to the holes as shown.

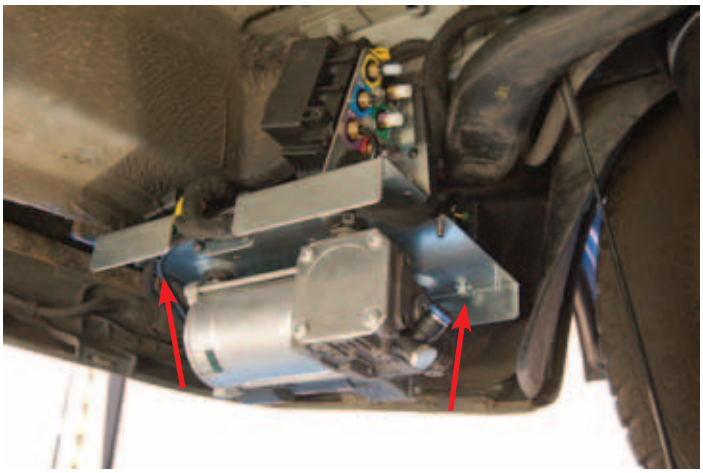
⚠	***When the vehicle has a towbar, please use the bolts of the towbar and not the supplied fasteners.***

70 Nm	***2 x Bolt M12x25 8.8*** ***2 x Washer M12***



3. Mount the compressorbox to the bracket with only the two marked nuts.

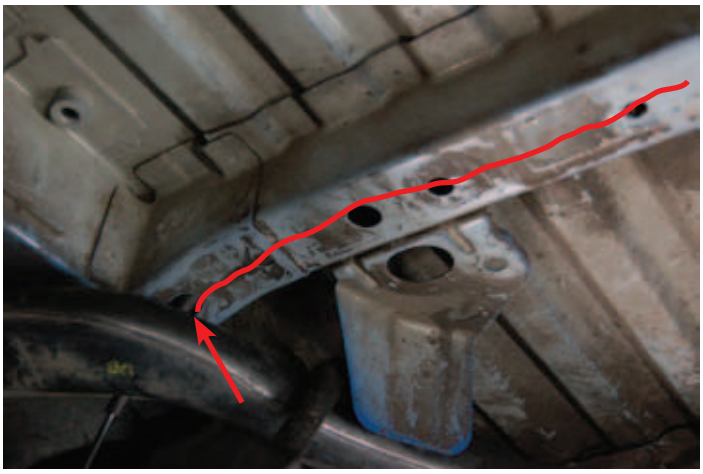
5 Nm	***2 x Flare lock nut M6***



4. Mount the under bumper.
5. Protect the black air tube with a black corrugated hose.

6. Push the **green** air tube in the valve block. Lead the **green** air tube to the left air spring, cut the air tube at the right length and mount it to the air coupler on the air spring.

7. Push the **black** air tube in the valve block. Lead the **black** air tube to the right air spring by leading it through the cross member of the chassis, cut the air tube at the right length and mount it to the air coupler on the right air spring.
8. Lay the complete wiring harness to the left heightsensor.



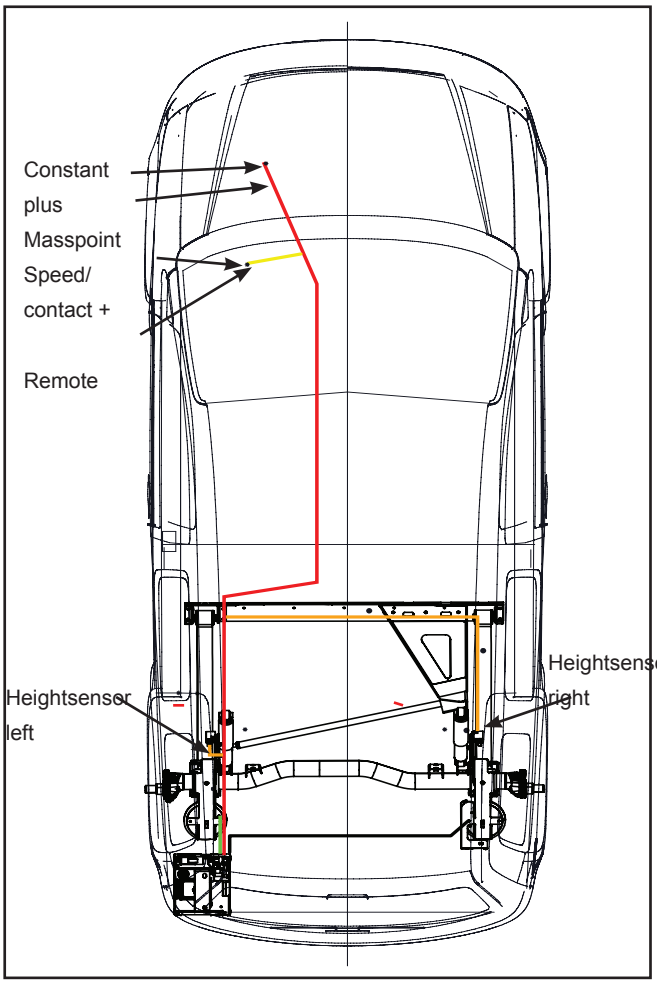
9. Mount the compressor protection cover.

5 Nm	***2 x Flare lock nut M6***

10. Push the compressor air intake tube in the hole of the filling pipe of the fueltank.
11. Mount the rear bumper back.

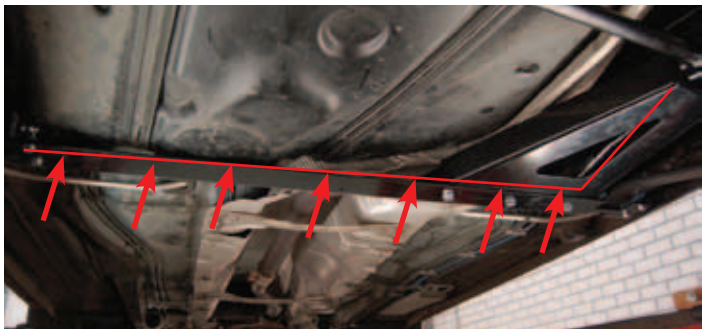
4.3 Wiring harness
4.3.1 Wiring harness

1. Place the wiring harness along the vehicle as in the picture.
2. Lay the wiring harness from the compressor along the left side of the fuel tank to the front of the car. Use sufficient cable ties to mount the wiring harness to the vehicle.

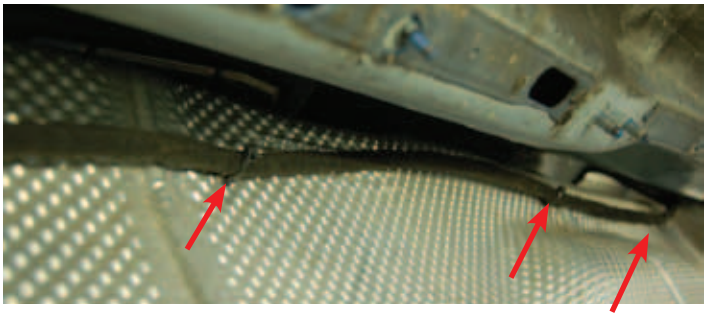


Make sure that the air tubes aren't near hot or moving parts.

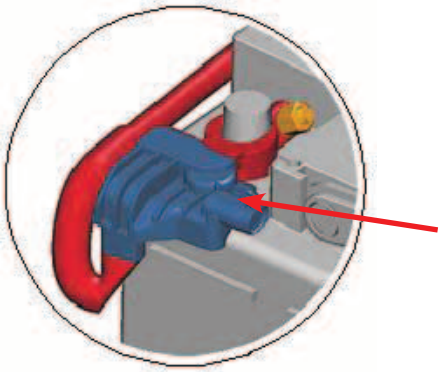
3. Connect the connector to the left heightsensor. The cable for the right heightsensor have to be mount on the cross beam to the right side of the vehicle and fastened with the earlier mounted cable ties.



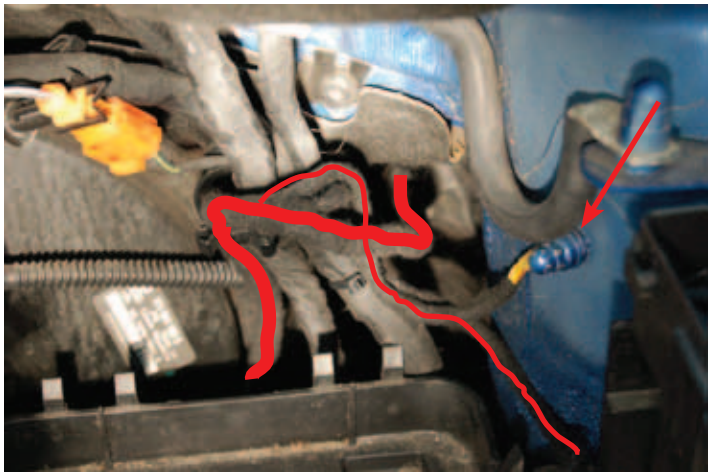
4. Disassemble the underside of the heat shield and carefully make holes of Ø6,5mm in it as shown in the picture.
5. Mount with cable ties with feet Ø6,5mm the wiring harness to the heat shield.
6. Place the wiring harness further to the battery on the left frontside of the vehicle. Use sufficient cable ties to mount the wiring harness to the vehicle.
Recommend to remove the cover of the air intake box and the battery.



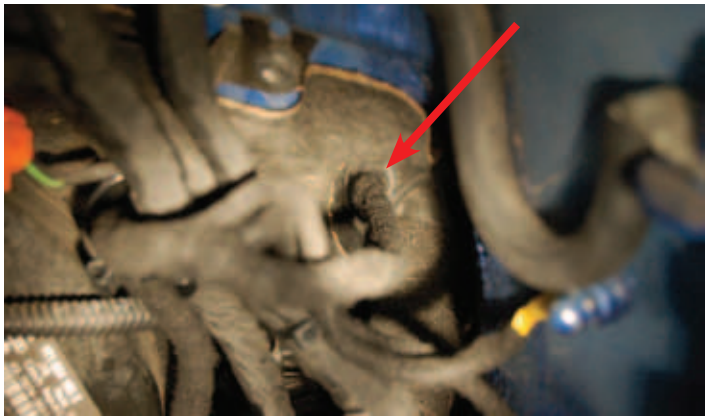
For models with a control unit for batterymonitoring it is not allowed to de-mount the battery. The control unit can be reconigzed on the extra box on the ground cable (blue marked in the picture).



7. Lay the wiring harness along the red line in the picture to the battery, use the original cable clamps.
8. Mount the mass cable to the vehicle mass-point in the motorcompartiment.
9. The supply cable with the fuses must be lead to the fusebox on the leftside of the vehicle under the bonnet.



10. The rest of the cables can be directed through the rubber thule in the vehicle.

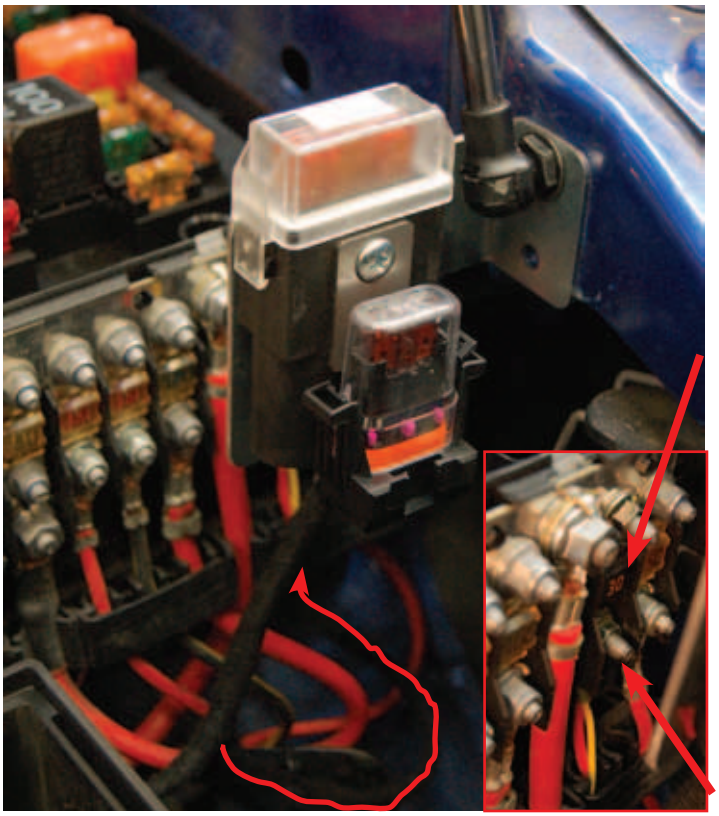


Tape the connectors together with a longer pin. Now, the connectors are easily guided to the inside of the vehicle.

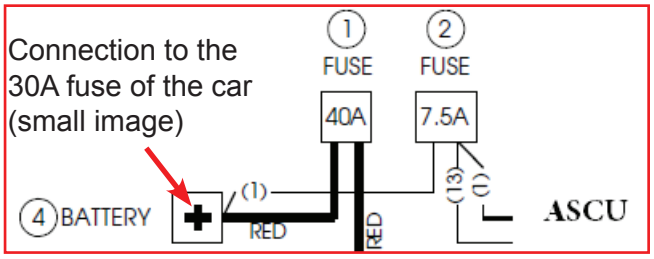
Be careful that the rubber thule don't damaged. if damaged, there's a chance that water comes in the vehicle.

4.3.2 Fuseholder

1. Mount the fuseholder to the bonnet gasdamper attachment point.
2. Don't mount the fuses yet.
3. Lay the yellow/red cable from the fuseholder to the original fusebox (along the red line) and connect it to the 30A fuse (see small picture).



Connection to the 30A fuse of the car (small image)



4. Mount the wiring harness to the original wiring harness so the wiring harness don't hang free anywhere.
5. The wiring harness inside the vehicle has two white connectors, 1 for the remote control and 1 for the contact+ and speedsignal.

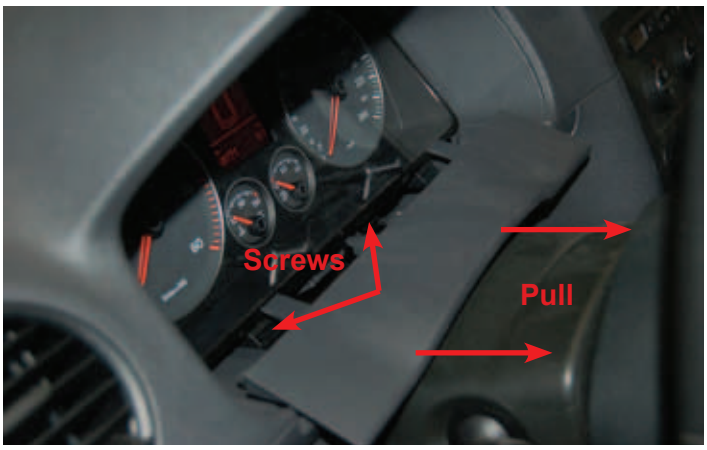
When the speedsignal option is ordered, please continue with paragraph 4.3.4

4.3.3 Handbrake signal

1. Remove the cover of the handbrake lever.
2. Search for the brown/yellow cable of the handbrake.
3. Connect the yellow VB-cable (19) with the braun/yellow cable.
4. Place the VB-cable underneath the middle console trough to the white connector under the steering wheel.
5. Mount the covers in reversed order.

4.3.4 Speed signal

1. Remove the instrument cluster by loosen the two indicated bolts. Now pull gently untill the instrument cluster comes to you.
2. Remove the outer side of the connector.
3. Slide the plastic part to the right untill you see the cables.



4. Place the yellow cable (nr 18) with the loose connector through the backside to the instrument cluster.
5. Place this cable in position 28 of the connector.

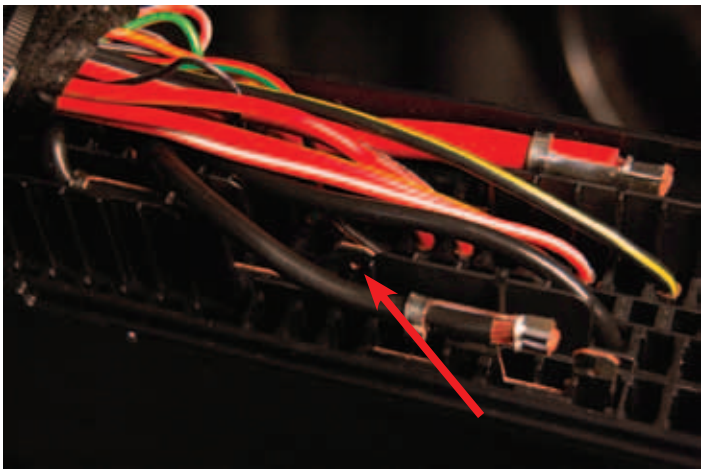
> ***If this pin is already occupied, cut the terminal of the yellow cable and connect the yellow cable (nr. 18) with the duraseal to the cable who is in pin 28 of the connector.***

6. Re-mount the connector and the instrument cluster in reverse order.

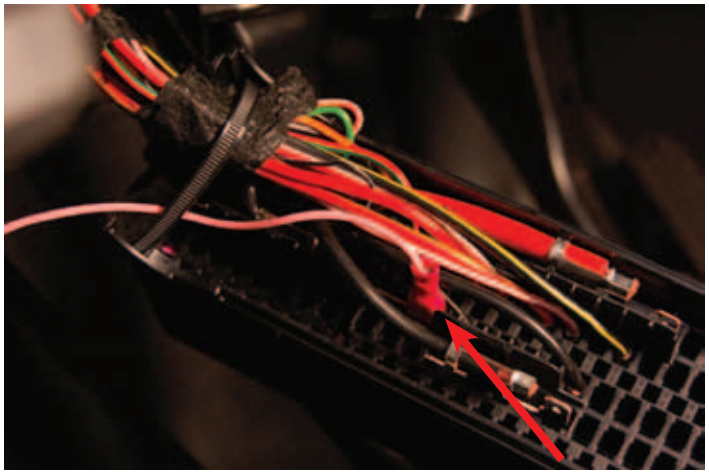
4.3.5 Contact plus (15+)

1. Remove the lower cover under the steering wheel.
2. Disassemble the original fusebox.

3. On the backside of the fusebox there is a pin (see arrow).

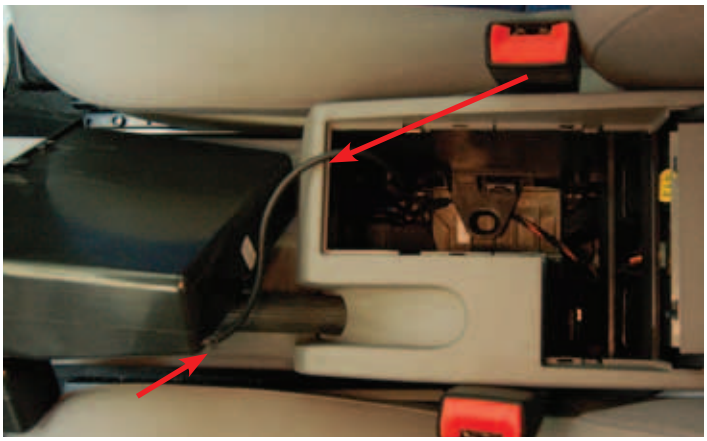


4. Stick the pink cable on the pin.
5. Mount the fuse holder and covers in reverse order.
6. Mount the white connector with the pink and yellow cable to the VB wiring harness in the car.
7. Mount the wiring harness with cable ties to the original wiring harness.

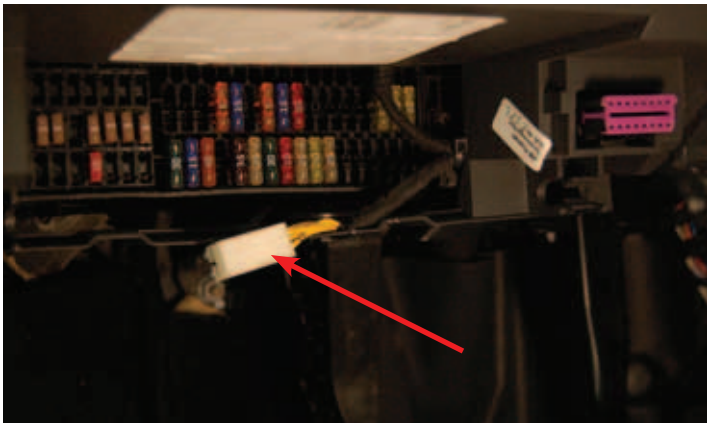


4.3.6 Remote control

VB-Airsuspension recommended the place on the picture. Make sure, that the remote control never comes in the way of the airbag.



1. Remove the stowage box out of the middle console arm rest.
2. Drill a small hole in the bottom so that the cable form the remote control fits trough it.
3. Lay the cable under the middle console to the front of the vehicle.



4. Lay the cable to the fusebox of the vehicle.
5. Mount the connector next to the EOBD connector of the car.
6. Connect the connector from the remote with the VB wiring harness.
7. Mount the VB wiring harness to the original wiring harness with cable ties.

8. Mount the remote holder in the stowage box and mount the remote in it.

4.4 Warranty sticker

1. Mount the spare wheel.
2. Place sticker ***B*** on the left upper air spring bracket.

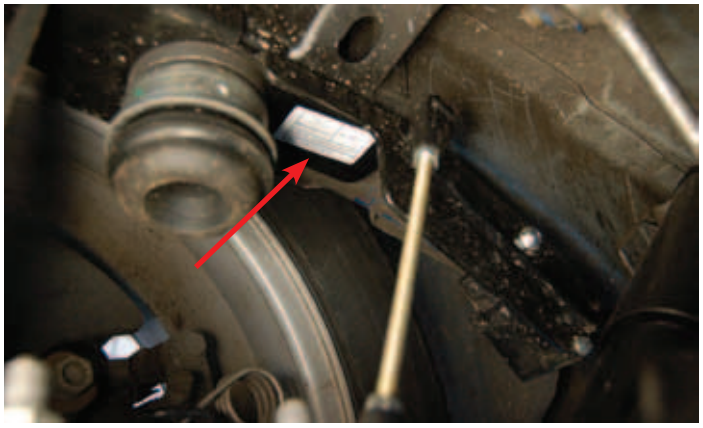
A

XXXXX XXXXX.XXX

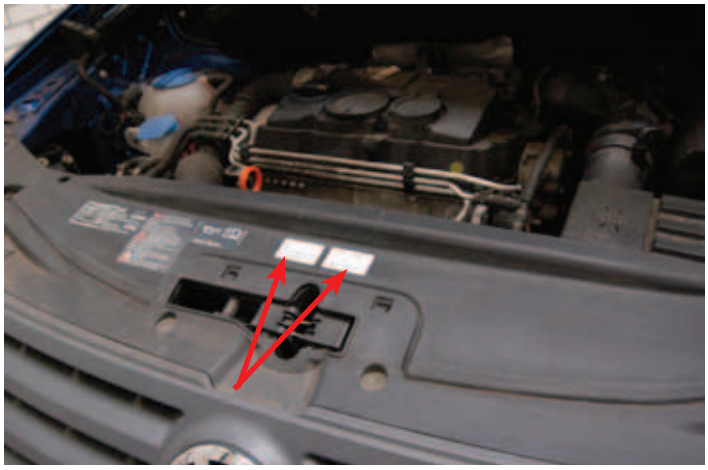
VB airsuspension

B

VB airsuspension	XX – XXXX ABE XXXXXX
AIR SUSPENSION KIT	
Part: XXXXXXXXXXXXXX	



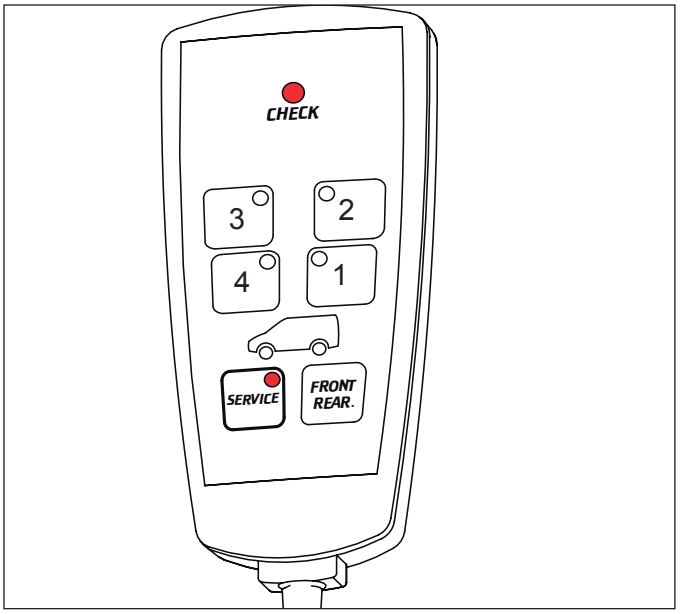
3. Place the warranty stickers ***A+B*** onder the hood like in the picture.



4. Note the installation of the air-suspension kit in the maintenance booklet.

5. Calibration

For an overview of the right calibration supports for this kit, please see chapter 2.



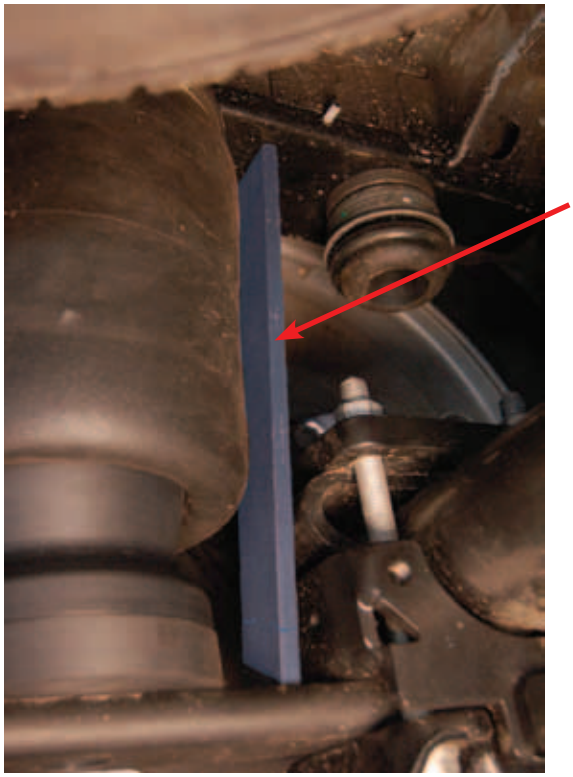
1. Mount the fuses (**F1=** 40A + **F2=** 7,5A).
2. Switch on the ignition.
3. Make sure the vehicle is standing on it's wheels, on a level surface.
4. Press the ***SERVICE***-key once (LED lights), and enter the following code within 10 seconds:

   1 - 3 - 4 - 2

   The system will give a long beep and reboot.
5. During the first beep, hold the ***SERVICE***-key, until a second long beep is heard. Now enter the following code within 10 seconds:

   2 - 4 - 3 - 1

   The calibration mode is activated. The rear axle LED and CHECK LED will blink.
6. Use the arrow key to lift the rear axle, so the calibration supports can be placed.
7. Put the vehicle on the calibration supports.
8. Use the arrow-keys to release all air from the air springs, until the hissing sound stops.
9. When the correct height is set, hold the ***SERVICE***-key until a long beep is heard. The ride height is now stored.
10. Briefly press the ***SERVICE***-key. The calibration mode is now closed. The system will reboot again.
11. Briefly press the ***SERVICE***-key to leave the Service mode.



12. Use the arrow key to lift the vehicle, so the calibration supports can be removed.
13. Remove the calibration supports.
14. Set the vehicle at ride height.
15. Switch off the ignition.
16. Secure all bolts an nuts, which were marked in this manual with **
17. Let an official dealer check the head-light adjustment.
18. Check the vehicle according to the checklist in this manual.

6. Checklist

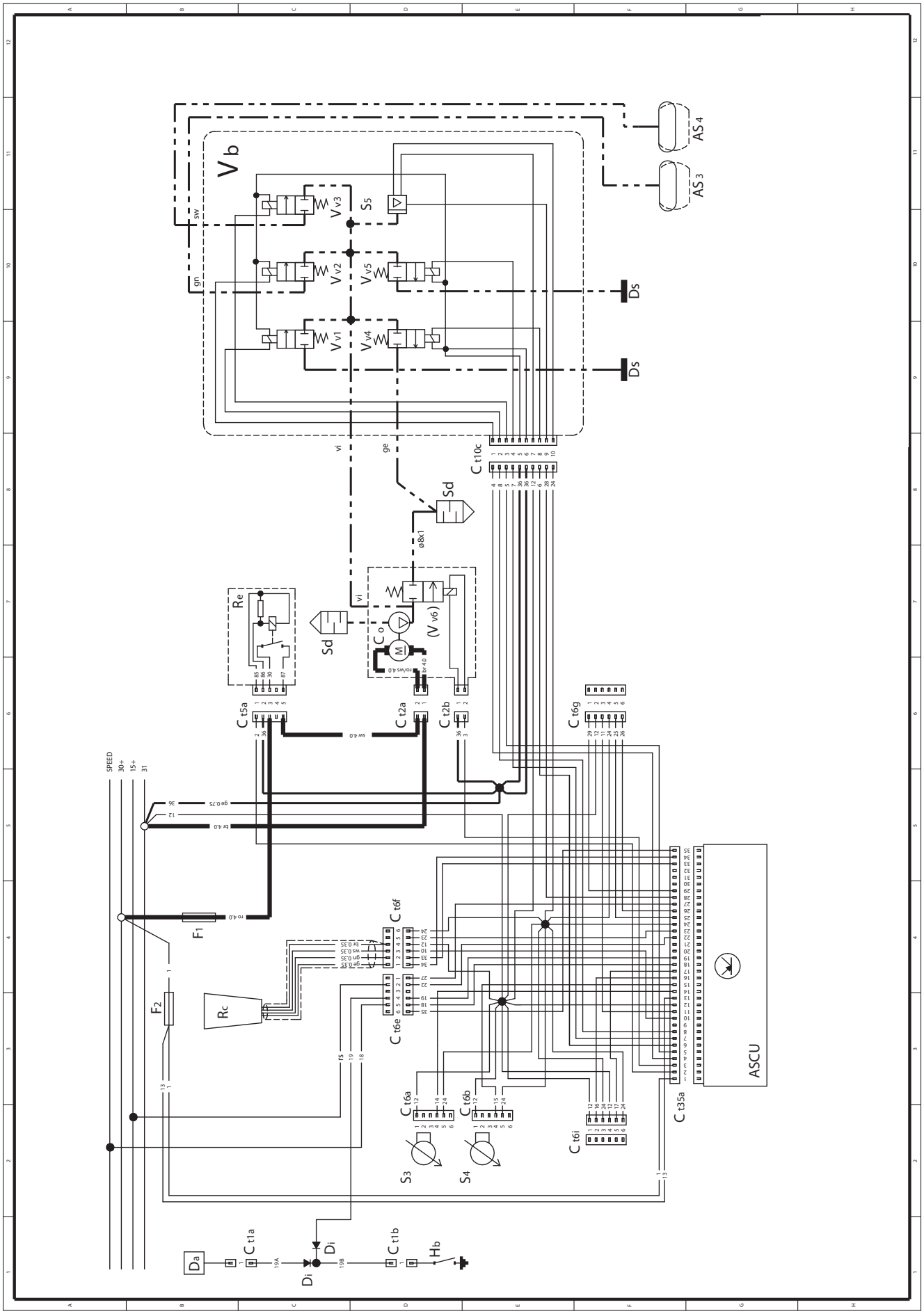
6.1 System finishing

		OK
1.1	Ride height correctly calibrated.	☐
1.2	Rear axle aligned.	☐
1.3	Height sensor correctly fitted.	☐
1.4	Bolts tightened to the right torque and checked off.	☐
1.5	Air tubes, cables and connectors correctly secured.	☐
1.6	System checked for airtightness.	☐
1.7	Space around the air springs checked.	☐
1.8	Documentation present.	☐
1.9	Head-light adjustment checked.	☐
1.10	Warranty form filled out and identification sticker fitted.	☐

6.2 Functions of system

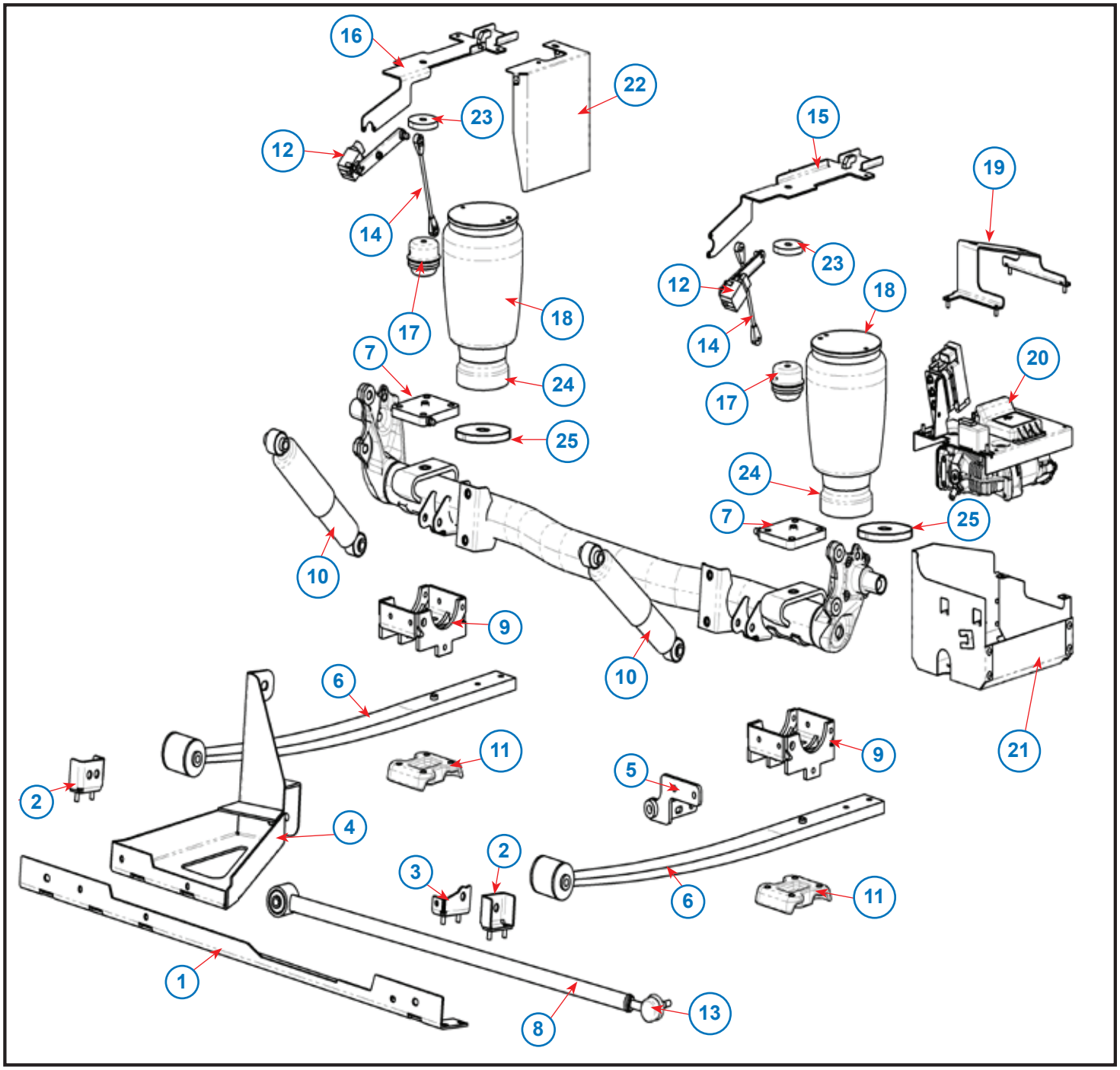
		OK
2.1	Manual raising.	☐
2.2	Automatic lowering.	☐
2.3	Manual lowering.	☐
2.4	Automatic raising.	☐
2.5	Test drive approved.	☐

7. Wiring diagram

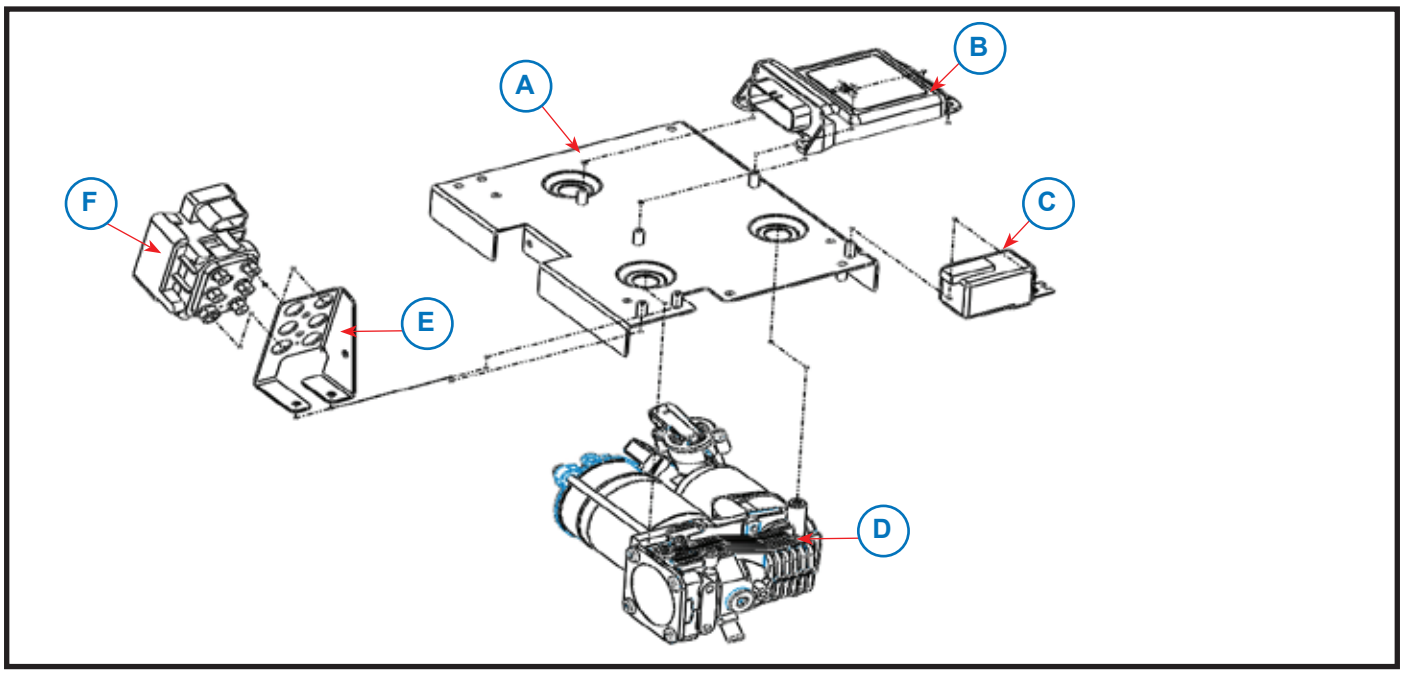


Name	Description
ASCU	VB-ASCU (control unit)
AS3	Air spring left
AS4	Air spring right
Co	Compressor
Ct1a	Connector, 1-pole, to dashboad
Ct1b	Connector, 1-pole, to handbrake
Ct2a	Connector, 2-pole, compressor
Ct2b	Connector, 2-pole, valve on compressor
Ct5a	Connector, 5-pole, relay Re
Ct6a	Connector, 6-pole, height sensor S3
Ct6b	Connector, 6-pole, height sensor S4
Ct6e	Connector, 6-pole, VB-supply cable (white)
Ct6f	Connector, 6-pole, remote control Rc (white)
Ct6g	Connector, 6-pole, option connector
Ct10a	Connector, 10-pole, valve block connection
Ct35a	Connector, 35-pole, VB-ASCU control unit
Ds	Blind plug
F1	Fuse compressor, 40A
F2	Fuse compressor, 7,5A
F3	Fuse BF1 on the battery 30A
Speed	Speed signal (Optional)
Hb	Hand brake signal (Optional)
Rc	Remote control
Re	Compressor relay
S3	Height sensor left
S4	Height sensor right
S5	Pressure sensor on valve block
Vb	Valve block
Vv1	Valve for air-spring, right front on valve block
Vv2	Valve for air-spring, left rear on valve block
Vv3	Valve for air-spring, right rear on valve block
Vv4	Dump valve, to release air on valve block
Vv5	Valve for air-spring, left front on valve block
Vv6	Release valve on compressor
Colourcode: (not mentioned, is yellow with wire number)	
bl	Blue
br	Brown
ge	Yellow
gn	Green
ro	Red
ro/ws	Red/White
rs	Pink
sw	Black
vi	Violet
ws	White
————	0,50 mm²
————	0.75 mm²
————	4,00 mm²
– – – – –	Air-tube

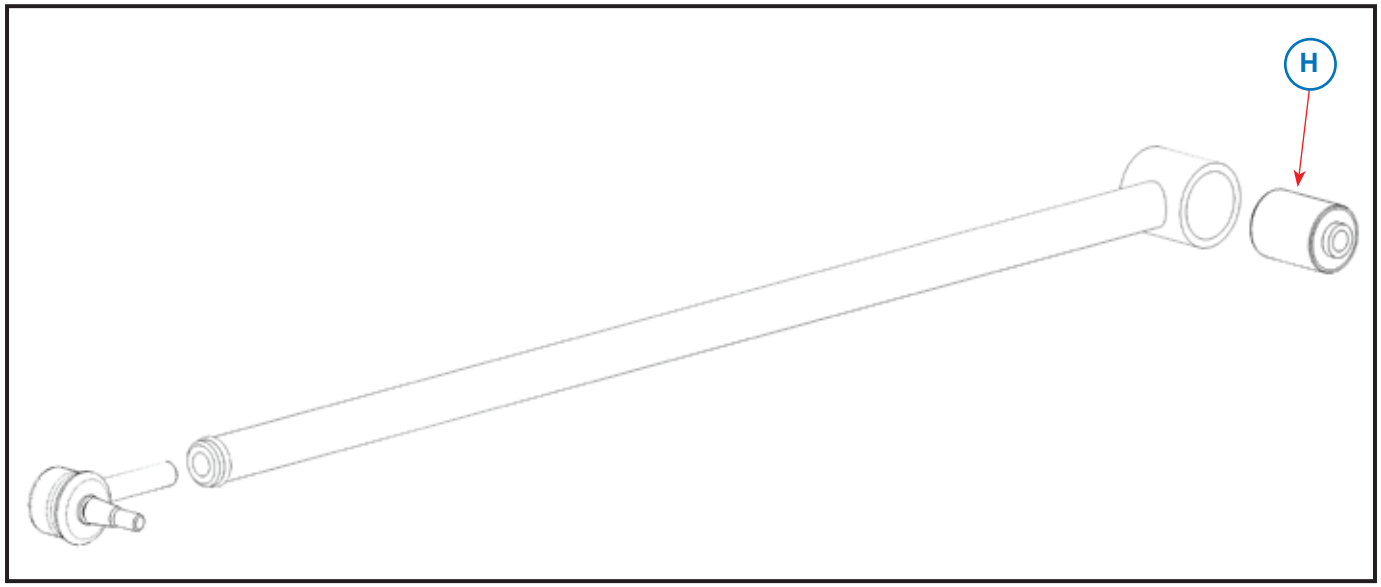
8. Exploded view



Item	Qty.	Description	Article nr.
1	1	Cross beam	105 215 13 04
2	2	Leafspring bracket	105 215 13 03
3	1	Leafspring bracket	105 215 13 01
4	1	Panhardrod bracket	105 215 13 05
5	2	Panhardrod ball joint bracket	105 206 00 70
6	2	Main spring	105 201 17 20
7	2	Upper clamping plate	105 202 00 09
8	1	Panhardrod	105 206 00 71
9	2	Lower clamping plate	105 202 00 08
10	2	Shock absorber	105 210 40 87
11	2	Clamping plate (Original)	-
12	2	Heightsensor	105 209 01 50
13	1	Panhardrod ball joint	105 206 14 15
14	2	Heightsensor rod H-H = 170mm	105 209 50 66
15	1	Upper air spring bracket left	105 203 01 80
16	1	Upper air spring bracket right	105 203 01 79
17	2	Bump stop	105 215 12 70
18	2	Air spring	105 203 25 31
19	1	Compressorbox bracket	105 213 11 18
20	2	Compressorbox	105 213 01 28
21	2	Compressorbox protection cover	105 213 11 23
22	1	Heat shield	105 235 00 73
23	2	Distance washer	105 202 57 23
24	2	Piston	105 203 01 25
25	2	Filling plate	105 203 01 85



Item	Qty.	Description	Article nr.
A	1	Compressor bracket	105 213 11 16
B	1	VB-ASCU	105 212 20 10
C	1	Relais	003 050 00 07
D	1	Compressor	105 211 11 00
E	1	Valve block bracket	105 213 11 17
F	1	Valve block	105 225 06 71
G	1	Wiring harness (Not shown)	105 220 11 64



Item	Qty.	Description	Article nr.
H	1	Rubber bush	105 206 50 21

9. Notes

VB-Airsuspension is producing, as one of the few European manufacturers, a very broad range of different (air-) suspension systems. From reinforced coil springs, semi-air suspension systems, up to complete full air-suspension systems, we provide solutions for customers with different vehicle types, like ambulances, minibuses, car transporters, motorhomes, etc. Now you can see why more and more commercial vehicle body manufacturers specify VB-Airsuspension on their vehicles.

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010050928-EN V1.2