

FITTING INSTRUCTIONS

making everyday smoother







• Increased comfort • Better driveability • More safety



LAND ROVER DEFENDER

with VB-FullAir for front and rear axle FOR KIT 1051601XXX

What has changed?

New version number: V1.1		V1.1
Release date:		3/26/2015
Changed compared to		V1.0
Page: (New version)	(New version) Changes	
7	Compressorbox mounting changed	
8	Add step for changing air coupling on valveblock	
8	Changed position of routing the wiring harness to the inside	
12	Add extra chapter for heightsensors on Defender 90	
16+22	Add extra steps for mounting the inlet line and cover plate on compressorbox	
17	Changed position of warranty sticker A+B	
18	New fitting sequence of mounting air spring front axle	
19+20	Added extra pictures for shock absober brackets	
21	Fitting the breather hose on the torque arm	



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1. Safety instructions

Personal safety instructions

- Always wear suitable protective clothing and safety boots.
- Do not wear rings, watches or loose clothing.
- · Never carry loose items in pockets.
- Tie back long hair.
- Never use broken tools. Only use tools for their intended purpose.
- Wear safety goggles.

General safety instructions

- If possible, always use a hydraulic ramp when carrying out the activities.
- If applicable, ensure that the vehicle is properly supported.
- Ensure that the vehicle cannot roll away.
- Improperly carried out installation can result in hazardous situations.

Symbols used

Caution



When the warning symbol is shown, information is provided that is extremely important for the safety and/or health of those involved.

This symbol is also used for procedures that are critical for the correct installation of the air suspension kit.

Tip



When the tip symbol is shown, information is provided that will help make installation of the air suspension kit simpler.

Torque



xx Nm

In this manual there is a check box next to each bolted joint showing the torque to be used when tightening the bolted joint.

2. Fitting instructions

This manual has been put together with great care and describes the steps for installing the air suspension indicated on the front page. However, the content of this manual is a snapshot view of the situation as at the time it was written.

VB-Airsuspension reserves the right to introduce technical changes at any time without warning.

The warranty is only valid if installation is carried out by a specialist workshop. Installation may only be carried out by suitably authorised personnel.

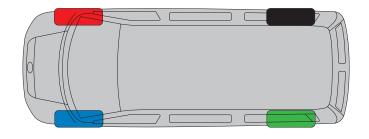
Staff must be experienced in working on light commercial vehicles, particularly in relation to electrics/electronics, pneumatics and general vehicle mechanics.

- · Use vehicle workshop manuals where necessary.
- Always follow the vehicle manufacturer's conversion instructions, unless expressly stated otherwise in this
 manual.
- Keep workplace clean and tidy.
- Always tighten nuts and bolts to the specified torque.
- If modifications have been made to the original anti-corrosion system, this must be rectified immediately. Use spray wax or a protective coating for this purpose.
- Always refit removed tubes and wires in the same way they were originally fitted.
- Secure pipes and wires with a sufficient number of tie-wraps. Ensure that the wires cannot be placed under tension
- The supply cable must be at least 100 mm away from the ABS/ESP block, the sensors and other control equipment.
- Ensure that there are no tight bends in air tubes and that they cannot be kinked or chafe against other parts.
- Never attach air tubes, wires or other parts to the vehicle's brake lines.
- Do not leave any tools, cleaning cloths or other materials behind after completing work.
- Use the checklist to check the air suspension system after fitting.
- Check the system for air tightness after fitting.
- Take the vehicle for a test drive after fitting.
- Ensure that the correct calibration supports are available. The correct calibration supports to be used with this kit are:

Axle:	Calibration height:	Order number:
Front axle	X = 150 mm	009 000 00 75
Rear axle	X = 325 mm	009 000 00 76

 The air suspension kit is supplied for four corners. If a part is specifically for one corner, it is identified with a coloured sticker.

Colour	Description
Green	Rear left
Black	Rear right
Blue	Front left
Red	Front right



3. Explanatory notes to this manual

This manual is intended for the air suspension kit for the:

Land Rover Defender

This manual describes the steps for fitting the air suspension to the front and/or rear axle. Follow the instructions in the appropriate section for the kit you are installing.

If you have a rear axle air suspension kit with part number 10516012XX, go to sections 4 and 5.

If you have a front axle air suspension kit with part number 10516014XX, go to sections 4, 5 and 6 of this manual to fit the front and rear axle air suspension.

The table below shows which sections you need to read:

Which axle?	Kit number	Section
Rear axle	105 16 01 2XX	4, 5
Front and rear axle	105 16 01 4XX	4, 5, 6

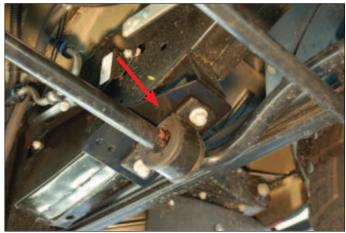
4. Compressor box and wiring harness

4.1 Compressor box

Remove the marked bolts.
 Do this on both sides.



2. Fit the stabiliser arm to the rear axle using the mounting plate.



Original fasteners



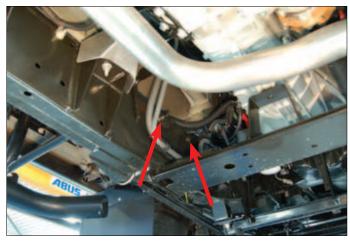
40 Nm

3. Fit the compressor box suspension support to the mounting plates.

Nm	8 Nm
4 x lock nut	M6
8 x washer	M6
4 x bolt**	M6 × 20

4. Remove the marked bolts.





5. Fit the compressor box suspension support to the chassis.

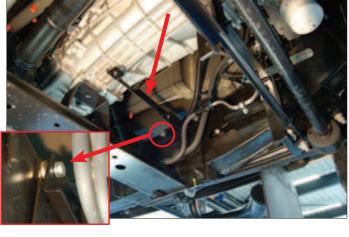


Fit 3 sheet-metal rings between the compressor box suspension support and the chassis.

2 x bolt** M10 x 110
6 x sheet-metal ring M10
2 x washer M10
2 x lock nut M10



60 Nm





Replace the two air couplings (Ø 6 mm) on the valve block with the two air couplings (Ø 4 mm) (RL and RR) supplied.



6. Fit the compressor box to the bracket.

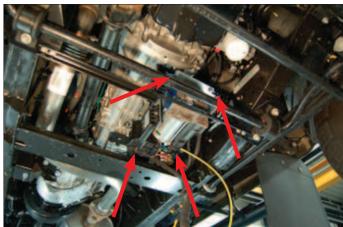
4 x flange lock nut M6



8 Nm

4.2 Wiring harness

- 1. Remove the specified covers (if present).
- 2. Remove the seat area from the driver's seat.
- 3. Take the cover plate off the battery housing.





- 4. Route the wiring harness to the front of the driver's seat.
- 5. Route the VB wiring harness through the indicated hole to the inside.



- 6. Connect the red wire to the connection marked on the positive battery terminal (+).
- 7. Connect the yellow and brown wire to the earth point.



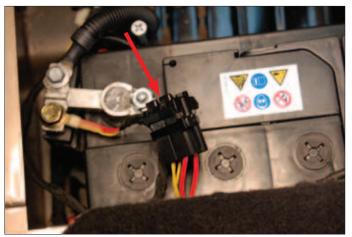
- 8. Connect the two yellow wires to the fuse block to which the *F2 7.5 A* fuse will later be connected.
- 9. Connect the two red wires to the fuse block to which the *F1 40 A* fuse will later be connected.



- 10. Do not fit the fuses yet.
- 11. Fit the fuse block as shown.

4.2.1 Supply cable

- 1. Connect the supply cable to the white connectors.
- 2. Route the supply cable to the rear of the instrument panel.

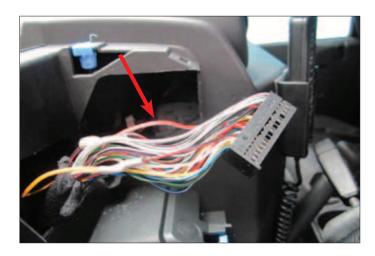




3. Remove the instrument panel from the dashboard.



Using the red connector, connect yellow wire
 no. 18 to the speed signal wire (black/red) on pin
 13 in the connector.Remove the dashboard panel.



- 5. Remove the connector from the sigarette lighter.
- 6. Connect the VB connector to the original sigarette lighter connecter.
- 7. Connect the VB connector to the sigarette lighter.



4.2.2 Remote control

- Identify a suitable location to install the remote control.
- 2. Place the remote control in the holder.
- 3. Ensure that the connector is not under tension.
- 4. Secure the end of the wire with a tie-wrap.



- 5. Connect the remote control wire to the VB wiring harness.
- 6. Refit the interior components removed earlier.
- 7. Ensure that the wires are neatly organised.



5. Fitting the air suspension kit for the rear axle

5.1 Preparations

- 1. Remove the shock absorbers.
- 2. Remove the springs.
- 3. Remove the lower spring bracket.



5.2 Air spring

1. Fit the air couplings to the air springs.

2 x air coupling

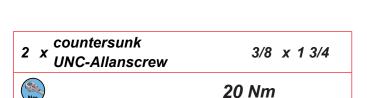


5 Nm

- Fit the top of the air spring.
- Use the black mounting plate at the top of the air spring and the plate at the top of the bellows support. The air coupling must face skewed towards the front and inside of the vehicle.
- 4. Fit the air spring as far towards the outside as possible, see photograph.

4 x UNC-bolt** 4 x washer	3/8 × 1 3/4 M10
Nm	20 Nm

5. Fit the lower mounting support to the air spring.



- 6. Fit the bottom of the air spring to the rear axle.
- 7. Pump air into the air springs with an external air supply so that the rubber is pulled straight.
- 8. Tighten the bolts at the top.

4 x lock nut 4 x washer	M10 M10	
Nm	20 Nm	







5.3 Shock absorbers

- First vent the shock absorbers before they are fitted.
- 2. Clamp the shock absorbers vertically in a bench vice.



The wide end of the shock absorbers is viewed as the top.

- 3. Gently push the top down and then slowly pull it up again.
- 4. A slurping noise may be heard at the end of the stroke; this indicates the presence of air.
- 5. Continue this pumping action until the slurping noise is no longer heard.



Always hold the shock absorber with the top pointing up. If you don't do this, air will enter the shock absorber again.

Fit the shock absorbers.

supplied fasteners



100 Nm

5.4 Height sensors

5.4.1 Height sensors Defender 90

1. Fit the height sensor to the height sensor bracket.



The colour markings indicate which part is for the left and which for the right.

See 'Fitting instructions'.

2 x washer

5 Nm

Nm

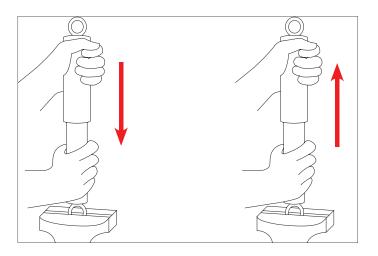
2. Fit the height sensor to the height sensor bracket.

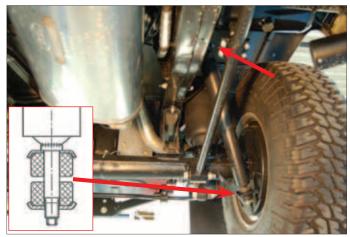


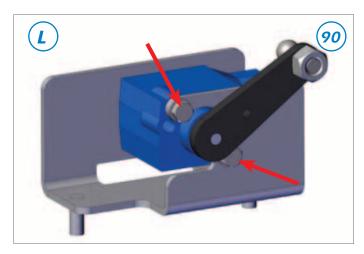
The colour markings indicate which part is for the left and which for the right.

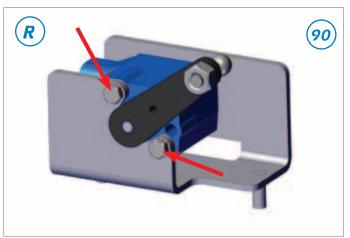
See 'Fitting instructions'.



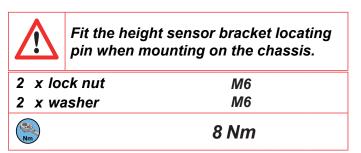








3. Fit the height sensor brackets in the position indicated.



4. Fit the ball-joint bracket to the torque arm.







- 5. Check the length of the height sensor rods (*L* = *60 mm*) measured centre to centre.
- 6. Fit the height sensor rods to the height sensors.
- 7. Fit the height sensor rods to the ball-joints.



5.4.2 Height sensors Defender 110&130

1. Fit the height sensor to the height sensor bracket.



The colour markings indicate which part is for the left and which for the right.

See 'Fitting instructions'.

§ 5 Nm

2. Fit the height sensor to the height sensor bracket.



The colour markings indicate which part is for the left and which for the right.

See 'Fitting instructions'.

§ 5 Nm

Fit the height sensor brackets in the position indicated.



The height sensor bracket must be fitted at the point where the body is fitted to the chassis.

original fasteners



20 Nm

4. Fit the ball-joint bracket to the torque arm.

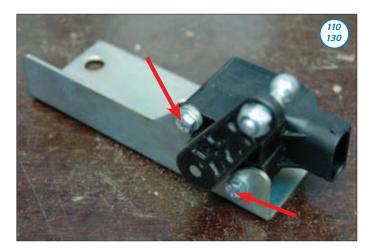


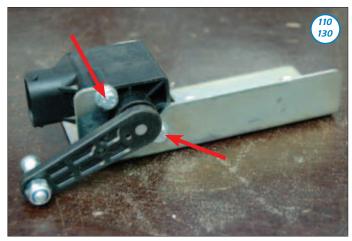
The distance between the ball-joint bracket and the flange on the torque arm is 140 mm.

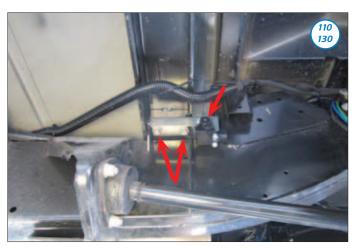


The height sensor rod must be fitted vertically.

8 x flange lock nut M6
6 Nm









- 5. Check the length of the height sensor rods (*L* = 145 mm) measured centre to centre.
- 6. Fit the height sensor rods to the height sensors.
- 7. Fit the height sensor rods to the ball-joints.

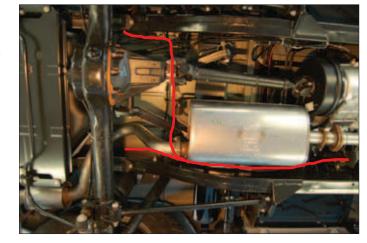


5.5 Air tubes

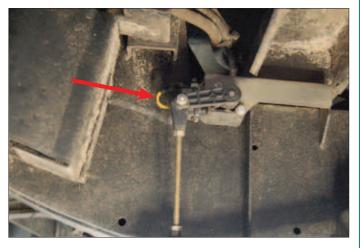
- 1. Connect the black air tube to the right air spring.
- 2. Connect the green air tube to the left air spring.



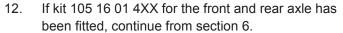
- 3. Route the air tubes along the left-hand side of the chassis to the compressor box.
- 4. Connect the height sensor wires on the rear axle to the connector with the white colour code.



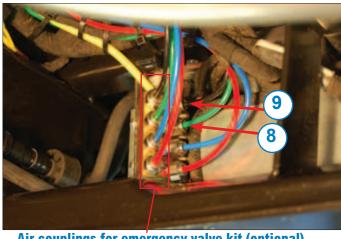
- 5. Route the right height sensor cable along the black air tube to the rear right height sensor.
- 6. Route the left height sensor cable along the green air tube to the rear left height sensor.
- 7. Connect the cables to the height sensors.



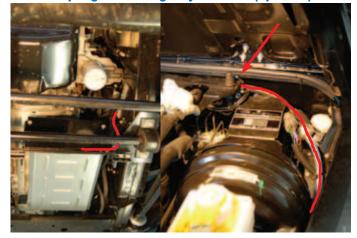
- 8. Fit the green air tube to the air coupling on the junction block on the outside of the compressor
- 9. Fit the black air tube to the air coupling on the junction block on the outside of the compressor
- 10. Ensure that the colour markings match.
- If kit 105 16 01 2XX for the rear axle has been 11. fitted, seal the unused air couplings with the end plugs supplied.



- 13. Route the inlet line up via the brake servo unit as shown.
- 14. Fit the inlet filter on the inlet line.
- Fit the inlet line under the bonnet. 15.



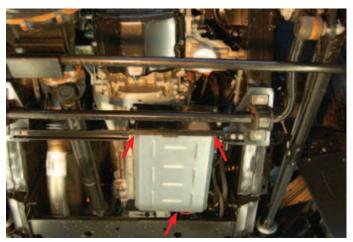
Air couplings for emergency valve kit (optional)

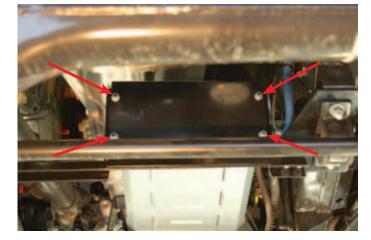


16. Fit the cover of the compressor box.



17. Fit the cover plate to the compressor box.

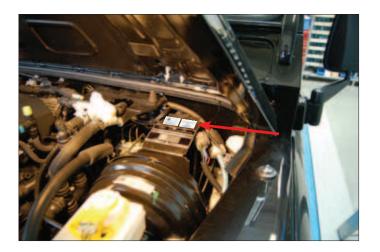






5.6 Warranty stickers

1. Affix the supplied warranty stickers **A** + **B** to the bracket above the vehicle type plate.



2. Affix sticker **B** to the upper spring plate.





If kit 105 16 01 2XX for the rear axle has been fitted, continue from section 7.1.

If kit 105 16 01 4XX for the front and rear axle has been fitted, continue from section 6.

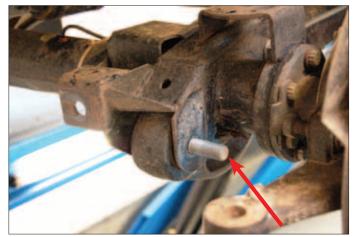
6. Fitting the air suspension kit for the front axle

6.1 Preparations

- 1. Remove the wheels
- 2. Remove the shock absorbers.
- 3. Remove the springs.
- 4. Remove the lower spring bracket.



5. Remove the nut from the torque rod.



6.2 Air spring

1. Fit the air couplings to the air springs.

Air coupling



5 Nm

2. Fit the air spring to the black mounting plate.



8 Nm

3. Fit the air spring to the upper mounting support. Observe L and R as shown.

8 x countersunk Allen screw M6 x 16



6 Nm

 Fit the air spring to the top of the shock absorber bracket. The shock absorber must be fitted at the front.

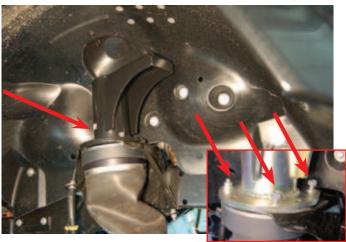


The air coupling must face skewed towards the front and inside of the vehicle.

8 x lock nut	М8
8 x washer	М8







5. Fit the lower mounting support to the air spring.



The centre of the air spring must be fitted behind the centre of the bracket.

2 x countersunk Allen screw UNC

3/8 x 1 1/2



10 Nm

- 6. Fit the bottom of the air spring to the rear axle.
- 7. Pump air into the air springs with an external air supply so that the rubber is pulled straight.
- 8. Tighten the bolts at the top.





20 Nm

6.3 Shock absorbers

- 1. First vent the shock absorbers before they are fitted.
- 2. Clamp the shock absorbers vertically in a bench vice.



The wide end of the shock absorbers is viewed as the top.

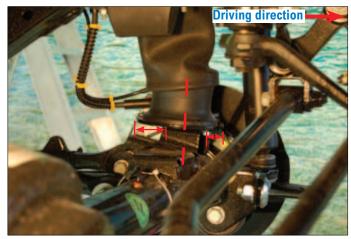
- 3. Gently push the top down and then slowly pull it up again.
- 4. A slurping noise may be heard at the end of the stroke; this indicates the presence of air.
- 5. Continue this pumping action until the slurping noise is no longer heard.

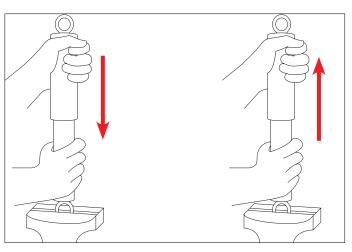


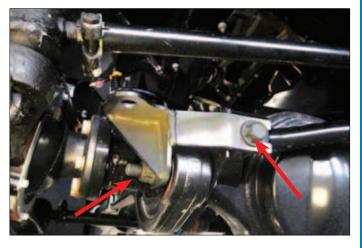
Always hold the shock absorber with the top pointing up. If you don't do this, air will enter the shock absorber again.

6. Fit the right shock absorber bracket.













7. Fit the left shock absorber bracket.

1 x countersunk Allan screw M₁₆ x 40

1 x countersunk washer M16 1 x washer M16 1 x lock nut M16



120 Nm

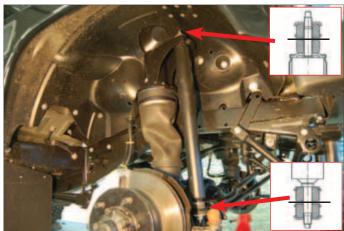
Original fasteners



120 Nm

8. Fit the shock absorbers.





supplied fasteners



120 Nm

6.4 Height sensors

1. Fit the height sensor to the height sensor bracket.



The colour markings indicate which part is for the left and which for the right.

See 'Fitting instructions'.

2	x bolt	M5 X	10
2	x washer	<i>M5</i>	



5 Nm

2. Fit the height sensor to the height sensor bracket.

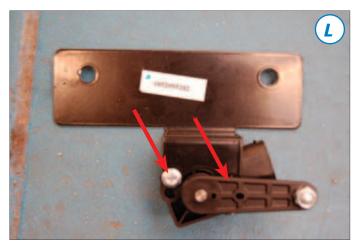


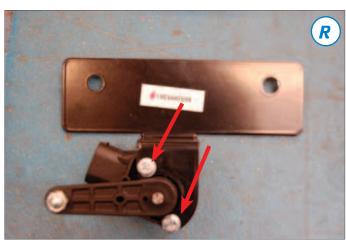
The colour markings indicate which part is for the left and which for the right.

See 'Fitting instructions'.

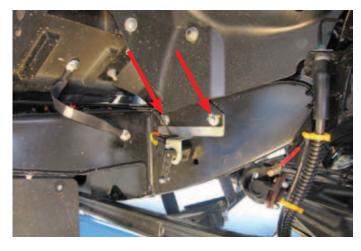
2 x bolt	M5 × 10
2 x washer	M5







3. Fit the height sensor brackets at the specified point between the chassis and the body mounting plate.



Original fasteners



20 Nm

4. Fit the ball-joint bracket to the torque arm.



The breather hose must be fitted between the ball-joint bracket and the torque arm.



The distance between the ball-joint bracket and the flange on the torque arm is 305 mm.

8 x flange lock nut

M6

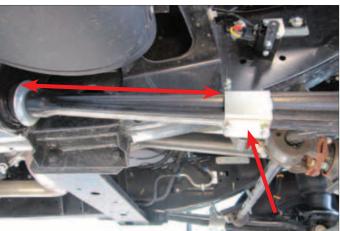


8 Nm



The height sensor rod must be fitted vertically.

- 5. Check the length of the height sensor rods (*L* = 100 mm) measured centre to centre.
- 6. Fit the height sensor rods to the height sensors.
- 7. Fit the height sensor rods to the ball-joints.



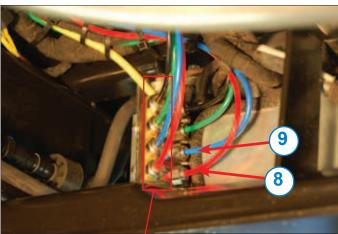


6.5 Air tubes

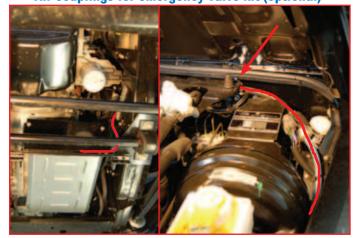
- Connect the blue air tube to the left air spring.
- 2. Connect the **red** air tube to the right air spring.
- 3. Route the air tubes along the left-hand side of the chassis to the compressor box.



- 4. Connect the front axle height sensor cable using the connector marked in brown.
- 5. Route the left height sensor cable along the blue air tube to the front left height sensor.
- 6. Route the right height sensor cable along the red air tube to the front right height sensor.
- 7. Connect the cables to the height sensors.
- 8. Fit the red air tube to the air coupling on the junction block on the outside of the compressor box.
- 9. Fit the blue air tube to the air coupling on the junction block on the outside of the compressor box.
- 10. Ensure that the colour markings match.
- 11. Route the inlet line up via the brake servo unit as shown.
- 12. Fit the inlet filter on the inlet line.
- 13. Fit the inlet line under the bonnet.



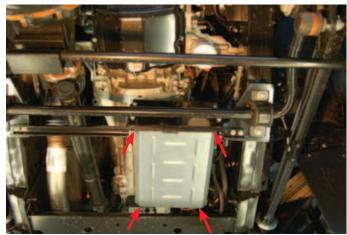
Air couplings for emergency valve kit (optional)

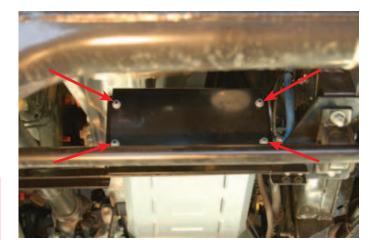


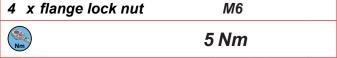
14. Fit the cover of the compressor box.



15. Fit the cover plate to the compressor box.







7. Calibration

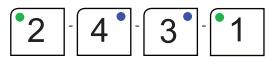
7.1 Calibrating 2C rear axle with 105 16 01 2XX kit

- 1. Place the fuses in the fuse blocks. (F1 = 40 A + F2 = 7.5 A).
- 2. Turn the ignition on.
- 3. Ensure that the vehicle is resting on the wheels on a flat surface.
- 4. Briefly press the **SERVICE** button once (LED lights up). Enter the following code within 10 seconds:



A long tone is heard, the system will restart.

5. Keep the SERVICE button held down while this long tone sounds, until a second long tone is heard. Enter the following code within 10 seconds:



Calibration mode is activated.

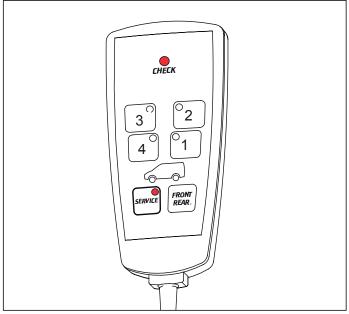
The rear axle LED and the CHECK-LED will start to flash.

- 6. Use the arrow buttons to raise the vehicle. Place the calibration supports under the vehicle.
- 7. Lower the vehicle onto the calibration supports.



Go to section 2 for details of the correct calibration supports for this kit

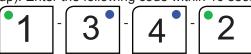
- 8. Use the arrow buttons to allow all the air to vent from the air springs. The air springs are empty once the hissing sound can no longer be heard.
- 9. The calibration height has been reached. Hold down the **SERVICE** button until the long tone is heard. The ride-height has been stored.
- Briefly press the SERVICE button once. Calibration mode is closed. The system restarts.
- Briefly press the SERVICE button once. SERVICE mode is closed.
- 12. Use the arrow buttons to raise the vehicle.
- 13. Remove the calibration supports from under the vehicle.
- 14. Set the vehicle to the ride-height.
- 15. Turn the ignition off.
- 16. Tighten all nuts and bolts indicated in the manual with **.
- 17. Have the headlamp adjustment checked by a dealer.
- 18. Check the vehicle using the checklist in this manual.





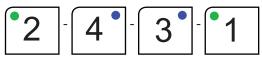
7.3 Calibrating 4C front axle and rear axle with 105 16 01 4XX kit

- 1. Place the fuses in the fuse blocks. (F1 = 40 A + F2 = 7.5 A).
- 2. Turn the ignition on.
- 3. Ensure that the vehicle is resting on the wheels on a flat surface.
- 4. Briefly press the **SERVICE** button once (LED lights up). Enter the following code within 10 seconds:



A long tone is heard, the system will restart.

5. Keep the SERVICE button held down while this long tone sounds, until a second long tone is heard. Enter the following code within 10 seconds:



Calibration mode is activated. The rear axle LED and the *CHECK* LED will start to flash.

- 6. Use the arrow buttons to raise the vehicle. Place the calibration supports under the vehicle.
- 7. Lower the vehicle onto the calibration supports.

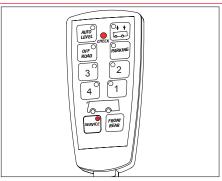


The bump stop must be removed from the front axle before calibration.

- 8. Use the arrow buttons to allow all the air to vent from the air springs. The air springs are empty once the hissing sound can no longer be heard.
- 9. The calibration height has been reached. Hold down the **SERVICE** button until a long tone is heard. The ride-height has been stored.
- 10. Briefly press the **FRONT-REAR** button once to select the front axle.
- Use the arrow buttons to set the front axle to the right height. The height is determined by the calibration supports and is measured as shown in the illustration.
- 12. Once the correct height has been set, hold down the **SERVICE** button until you hear a long tone. The ride-height has been stored.
- 13. Briefly press the **SERVICE** button. Calibration mode is closed. The system restarts.
- 14. Switch service mode off by briefly pressing the **SERVICE** button again.
- 15. Use the arrow buttons to raise the vehicle.
- 16. Remove the calibration supports from under the vehicle.
- 17. Mount the bump stops on the front axle.
- 18. Set the vehicle to the ride-height.
- 19. Turn the ignition off.
- 20. Tighten all nuts and bolts indicated in the manual with **.
- 21. Have the headlamp adjustment checked by a dealer.
- 22. Check the vehicle using the checklist in this manual.



Go to section 2 for details of the correct calibration supports for this kit.



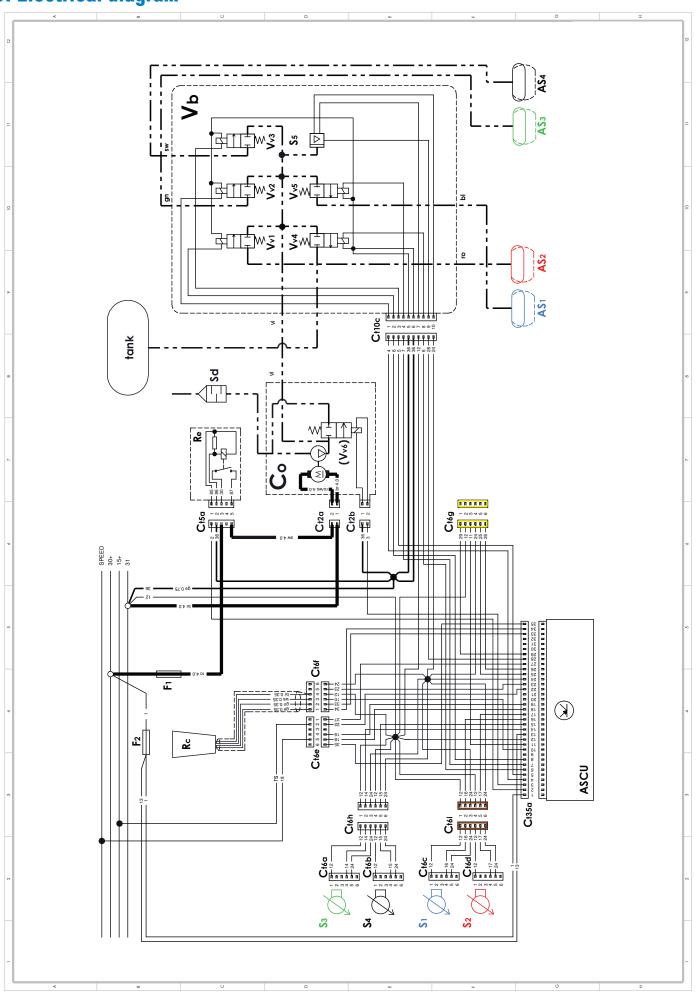




8. Checklist 8.1 Final checks

8.1 Final checks		OK
1.1	Ride-height correctly calibrated.	
1.2	Front axle/rear axle aligned.	
1.3	Height sensors correctly fitted.	
1.4	Shock absorbers vented.	
1.5	Bolts tightened to correct torque and ticked off.	
1.6	Air tubes, wires and connectors properly secured.	
1.7	System checked for air tightness.	
1.8	Clearance around air springs checked.	
1.9	Headlamp adjustment checked.	
1.10	Documentation present.	
1.11	Warranty form completed and identification stickers affixed to vehicle.	
8.2 System functions OK		
2.1	Raise manually.	
2.2	Lower automatically.	
2.3	Lower manually.	
2.4	Raise automatically.	
2.5	Test drive passed.	

9. Electrical diagram



Name Description	
ASCU VB-ASCU (electronic control unit)	
AS1 Air spring, front left	
AS2 Air spring, front right	
AS3 Air spring, rear left	
AS4 Air spring, rear right	
Ct2a Connector, 2-pin, compressor power supply	
Ct2b Connector, 2-pin, dump valve on compressor	
Ct5a Connector, 5-pin, compressor relay	
Ct6c Connector, 6-pin, height sensor left	
Ct6d Connector, 6-pin, height sensor right	
Ct6e Connector, 6-pin, VB supply cable	
Ct6f Connector, 6-pin, remote control	
Ct6g Connector, 6-pin, connector option (yellow)	
Ct6h Connector, 6-pin, rear axle height sensors (white)	
Ct6i Connector, 6-pin, front axle height sensors (brown)	
Ct10c Connector, 10-pin, valve block	
Ct35a Connector, 35-pin, VB-ASCU	
Co Compressor	
Ds End plug	
F1 Fuse, compressor, 40 A	
F2 Fuse, VB-ASCU, 7.5 A	
Re Compressor relay	
Rc Remote control	
S1 Height sensor, front left	
S2 Height sensor, front right	
S3 Height sensor, rear left	
S4 Height sensor, rear right	
S5 Pressure sensor on valve block	
Sd Air silencer/filter	
Vb Valve block	
Vv1 Valve for front right air spring on valve block	
Vv2 Valve for rear left air spring on valve block	
Vv3 Valve for rear right air spring on valve block	
Vv4 Dump valve to vent air on valve block	
Vv5 Valve for front left air spring on valve block	
Vv6 Dump valve on compressor	
Colour codes (yellow with wire number is not indicated)	
bl Blue	
br Brown	
ge Yellow	
gn Green	
ro Red	
ro/ws Red/white	
rs Pink	
sw Black	
vi Purple	
ws White	
0.50 mm ²	
0.75 mm ²	
4.00 mm ²	
Air tube	



VB-Airsuspension is one of the few European manufacturers producing a wide range of (air) suspension systems. From semi air suspension and simple reinforced coil springs to full air suspension systems: we offer customers the ideal solution for a range of applications such as ambulances, car transporters and motorhomes. Now you know why more and more body shops and commercial vehicle manufacturers are making VB-Airsuspension systems their benchmark.









Dealer:



