RANGE ROVER P38A SUSPENSION SET UP AND CALIBRATION (English Version)

This is a guide for the correct calibration of the air suspension system employed on the second generation Range Rover.

Obviously this guide should be reffered to every time we change a height sensor on the vehicle. But it can also be used to re-calibrate the system and set up of the vehicle as through the years the wear and tear on height sensors can provoke incorrect readings. Before starting this operation be sure to work in a safe area where the vehicle cannot move suddenly, leave the handbrake on during this job. SAFETY FIRST!

> **LEVELLING THE VEHICLE:** The first thing we should do to obtain a correct set up is to make sure that the ground we are going to be working on is completely flat and level. This phase is absolutely necessary.

1. Make as certain as possible that the ground the vehicle is on is flat and secure.

2. Tyre pressure has to be absolutely correct on all four wheels, otherwise this too will cause a false reading on one or more sensors.

To make sure that the vehicle was perfectly level I used this method: Once we are sure the vehicle is on flat ground, take a straight piece of wood, steel or alluminium, and place it on the edge of the INSIDE of the front and rear wheels. As can be seen the photographs 1 & 2.

(The width between the rear wheels should be 131,5 cm)

(The width between the front wheels should be 133 cm)

To check that both axles are level place a builders spirit level on the wooden or metal bar between the axles and verify that it is perfectly horizontal as shown in photo 3.

Foto 1

Foto 2

Photo 3 this has to be done on both front and rear axles (see spirit level placed on the strip of wood to verify that the wheels are pefectly horizontal)

POSITIONING OF THE CALIBRATION BLOCKS AND CALIBRATION:

Firstly we need to obtain the calibration blocks (4 for each height) for the different height settings. (I used a very simple method of making my own blocks. From a DIY store I bought a round length of wood with a 3cm diameter and I cut 16 lengths from the piece of wood).

These 16 pieces need to be cut to the following different lengths: It would be a good idea to write on each calibration block the correct height of each single piece, and if it is front or rear (Source of measurements from: (http://www.mez.co.uk/p38-eas.html)

HIGH SETTING:

n° 2 blocks 145mm rear setting

n° 2 blocks 140mm front setting

STANDARD SETTING:

n° 2 blocks 105mm rear setting

n° 2 blocks 100mm front setting

LOW SETTING:

n° 2 blocks 80mm rear setting

n° 2 blocks 75mm front setting

ACCESS SETTING:

n° 2 blocks 40mm rear setting

n° 2 blocks 35 front setting

Lets start with the HIGH SETTING:

Position the HIGH length calibration blocks under the bump stop rubbers on the chassis.

See photo 4 (front) 5 (rear)

Foto 5

In order to position the calibration blocks the chassis needs to be raised with a trolley jack, or by using the EAS system itself. (I used a control unit which I built myself with which I can activate the EAS unit to raise and lower the vehicle from outside). See photo 6

Foto 6

(home made hand held EAS activation module)

Once the calibration blocks have been positioned under the chassis on the axles, slowly lower the vehicle onto the blocks.

NOTE THAT THE CALIBRATION BLOCKS ARE FIRMLY SECURED UNDER THE WEIGHT OF THE VEHICLE. CHECK BY USING A TOOL TO SEE IF THEY MOVE. **DO NOT PUT YOUR HAND UNDERNEATH THE BUMP STOP**

Now with use of a Diagnostics system tool and OBDII cable (Rovacom, Nanocom, Faultmate)and by downloading the EAS unlock suite from http://www.rswsolutions.com/index.php?option=com_content&view=article&id=53&Itemid=56

Read the heights of the HIGH SETTING front and rear and write them on a piece of paper.

For the ACCESS SETTING height I did not use the calibration blocks, as they were shorter than the bump stops themselves. So the vehicle was lowered until the bump stops were just touching the axles.

And I wrote down that reading from the sensors. (This method is incase I need to drive sat on the bumps stops under a low tunnel or something, and the vehicle would have just that little bit of shock absorbtion from the bump stops).

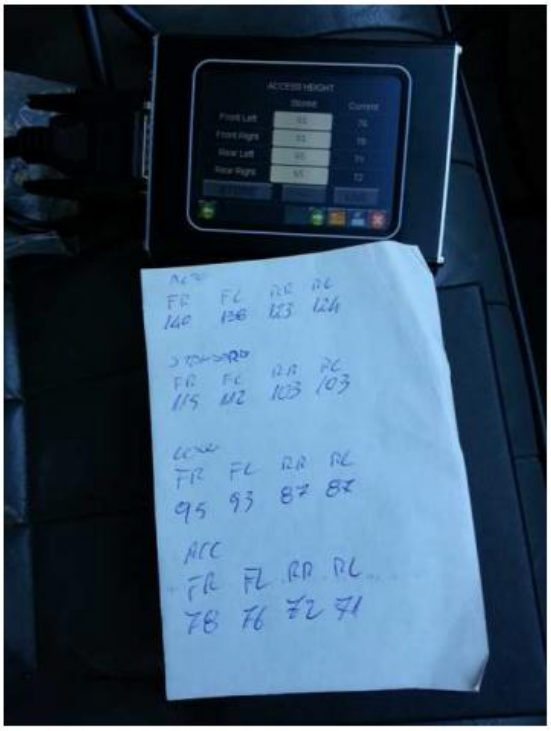
MEMORIZING HEIGHTS INTO THE SUSPENSION ECU

Once we have all the heights written down, we can proceed to writing them to the suspension ECU unit.

Carefully communicating the measurements. High to High Standard to the standard section and so on.

Below are a few photo's of how I proceeded to saving the calibration readings to my Nanocom Diagnostics Tool.

In the photo we can see in the "STORED" column the old heights saved. And in the "CURRENT" column the actual heights, which were promptly saved to the memory of my Nanocom Diagnostics Tool.



Final phase: Now we have concluded everything, be sure to have removed the calibration blocks from under the vehicle. Now we can proceed to a first verification of the suspension.

Start the engine and you will see that once the vehicle has reached the selected height position it will no-longer make any adjustments. This means everything has been done correctly. All we need now is to go for a drive and see if all is working correctly. The photo's below show the home made Calibration Blocks: HIGH

Standard

Low

The range of values to be communicated to the suspension ECU

The ECU will accept only a certain range of values (bit) for each postion. If you try to write an ACCESS height value to the STANDARD height, the ECU will not permit this, and will send back a message of error.

Below the range of values that can be introduced:

POSITION	**SENS FRONT**	**SENS REAR**
High	120-180	105-150
Standard	95-150	85-130
Low	75-140	75-120
Access	50-110	50-100

Using this table nothing can stop you from setting the various heights to a desired preference.

So long as the values introduced enter within the ranges accepted, and that you use as a basefrom which to start the values previously read.

Eg. If you would like the STANDARD height slightly higher, then all you will need to do is just raise the base value (No. Of bit). Obviously the number of bit need to be the same on all four sensors.

In my own personal case the heights read with the calibration blocks were:

FL 122 (112+10)

RR 113 (103+10)

RL 113 (103+10)

These new parameters are still within the range of values accepted by the EAS ECU.

I decline all responsability for eventual harm or damage to persons and material objects such as parts of the vehicle in question or others. It is obvious that working underneath any motor vehicle can present a danger to anyone. I FULLY RECOMMEND THIS WORK TO BE DONE BY PERSONS WITH A MINIMUM OF EXPERIENCE.

The contents of this article are to be considered as UNOFFICIAL, and serve only as a guideline for the experienced enthusiast mechanic.

ALWAYS WORK WITH SAFETY IN MIND. ☺

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(English Translation Colin Buckley)

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