Proper Ride Height and Axle Lift Set-up

We have noticed, on our roads, that vehicles fitted with BPW axles and air suspensions are running with very low ride heights. In some instances vehicles fitted with an axle lift can be seen, where the lift axle tyres are raised only a couple of centimetres off the ground. Due to this, tyres can be seen with flat spots because of scuffing on our bumpy roads and also accelerated wear of moving parts in the axle lift device.

Understanding the suspension configuration and ride height.

BPW produces a range of air suspensions to accommodate different ride height requirements. (Please contact BPW for installation instructions on BPW air suspensions). In principle the method of setting the ride heights on all series of BPW air suspensions is the same.

The ride height will also depend on the suspension configuration, where the over slung (see figure 1 and 2 below) will provide high/medium chassis height. The under slung (see figure 3 below) will provide lower chassis height.

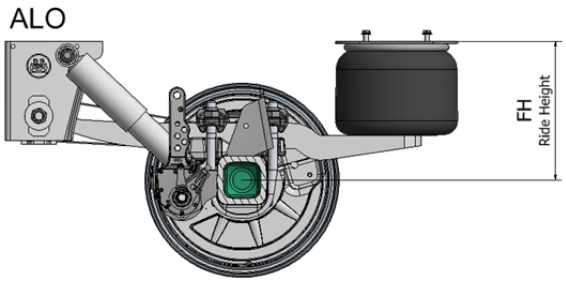

Figure 1: Over slung high ride height.

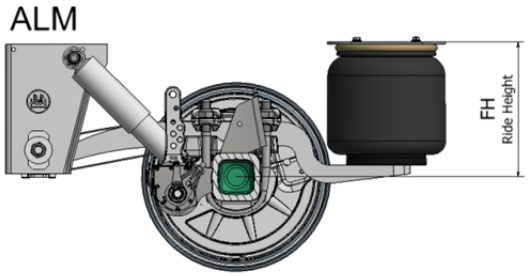

Figure 2: Over slung air with medium ride height.

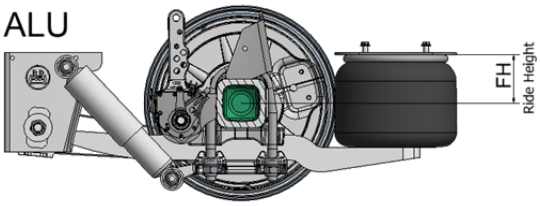

Figure 3: Under slung for low ride height.

Setting your ride height.

The following is a procedure that must be adhered to when setting the ride height:

- The vehicle must be on level ground.
- The vehicle's brakes are released.
- The vehicle's wheels are chocked.
- The air brake system is fully charged.

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- The measuring of the ride height is, from the centre of the axle, to under the chassis beam.

Using the automatic levelling valve to ensure correct ride height is maintained.

BPW air suspension axles are manufactured to accommodate a levelling valve. The levelling valve regulates the air bag pressure according to the respective load, thereby holding the vehicle at a constant level.

The levelling valve has to be installed and set correctly as follows:

- The levelling valve must be fixed to the vehicle frame and connected to the axle via linkage rods.
- The horizontal linkage rod connected to the valve must be at least 200mm long.
- The vertical linkage rod which is connected to the axle and to the horizontal linkage rod via rubber connectors must form an angle of less than 90 degrees.
- The levelling valve must face the direction of travel and also the linkage rods of the valve.
- Ensure that the levelling valve linkage rods are not fouling against any air pipes or gussets.

The levelling valve is normally connected to the centre axle of a tridem, and to the rear axle of a tandem.

Under special circumstances (e.g. axle lift device or extreme vehicle inclinations), the levelling valve can also be linked to the front or rear axle.

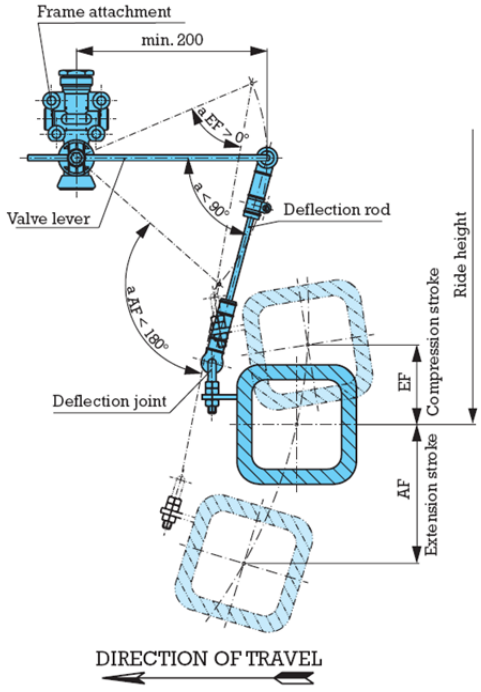

Figure 4: Levelling valve with stroke.

Confirming your ride height.

To ensure that all the installations were done correctly it is recommended to confirm your ride height. The measured ride height needs to be confirmed within the allowable limits stated below.

Confirming that your ride heights are within the allowable limits:

- Loosen all pivot bolts.
- Measure the ride height from the centre of the axle to under the chassis beam.
- Write down the measured distance.
- Disconnect the levelling valve and release the air out of the air bags into the atmosphere.
- Measure again, this time with no air in the air bags.
- Write down the measurement.
- The difference between the two measurements must be as follows:
  - No axle lift device fitted = 80mm
  - Axle lift device fitted = the axle's upward travel should be set to a minimum of 100mm

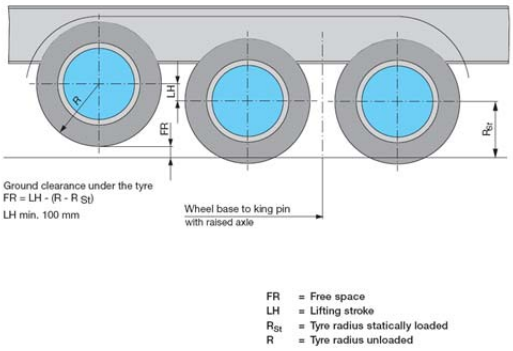

Figure 5: Axle lift and required ride height.

The rectifying of the ride height can be done as follows:

- Re-connect the levelling valve and allow the air to inflate the air bags. Remember the air system must be fully charged.
- Adjustment and setting of the correct ride height can now be done on the levelling valve linkage rod.
- In some instances the vertical linkage rod might be too short in length and needs to be replaced with a longer one.
- Always ensure that the horizontal linkage rod distance connected to the valve is a minimum of 200mm and the vertical rod connection to the horizontal rod is less than 90 degrees.
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- Once the ride height has been reset correctly, re-tighten the pivot bolt & nuts to their respective torque settings.
  - M24 pivot bolt nut **650 Nm** (605 – 715 Nm)
  - M30 pivot bolt nut **900 Nm** (840 – 990 Nm)
- After the first laden trip, re-torque the pivot bolt & nuts.

More detail on your axle lifts

Multi axle suspensions are frequently equipped with axle lifts to reduce both tyre wear and fuel consumption in both partially laden and unladen state. When it comes to air suspension, this functionality can be realised simply, and controlled or regulated electronically in a suitable manner.

Type of BPW axles lifts

BPW have two types of axle's lifts available (see figure 6 and 7 below): The centre axle lift (used in the under slung configuration) and double sided axle lifts (used for the over slung configuration). The centre axle lifts uses an air bag to generate a moment on and around a pivot point (centre hanger) to lift the complete axle in the centre. The double sided axle lifts uses single diaphragm boosters mounted to the hangers on each side and use the trailing arm to lift the axle.

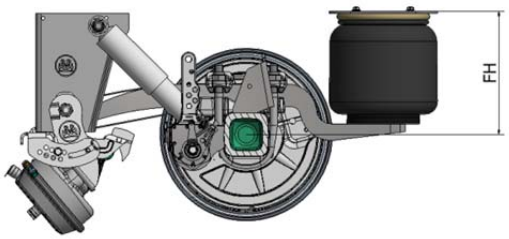

Figure 6: Double sided axle lift. Located to the hanger brackets.

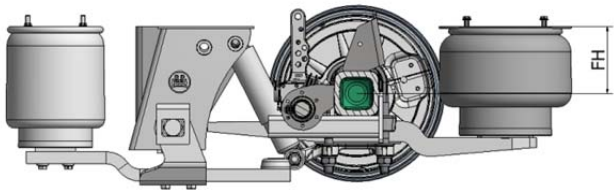

Figure 7: Centre Axle lift located in the centre of the chassis with a separate hanger bracket.

Ensuring that ride height is set correct to achieve sufficient ground clearance for tyres.

It is crucial to ensure sufficient tyre to ground clearance when axle lifts are in operation. Insufficient tyre clearance will result in accelerated tyre wear and flat spots on the tyres due to scuffing.

To achieve sufficient ground clearance it is sometimes believed to help, by changing the hole position of the axle lift, but this is simply incorrect. The axle lift can only raise the axle until the bump stop in the airbag is reached. To ensure that the axle lifts are installed correctly please refer to BPW user manual or contact BPW if there are any queries regarding this system.