

# ASSEMBLY GUIDELINES



## AIR SUSPENSIONS

with Weld-on Axle Seats  
Series AL II



**TRANSPEC**  
ENGINEERED TO LAST

**B**PW Air Suspensions are available for installation in either single or multi-axle configurations.

The axles are connected to the vehicle's chassis frame via the hangers, trailing arm springs and airbags. The U-shape formed by the axle and the trailing arm springs acts as an effective stabilizer to counteract trailer roll while cornering. All vertical loads are transmitted to the vehicle frame via the hanger brackets and airbags.

The trailing arm springs counteract the side and braking forces, which are transferred to the trailer frame through the hangers

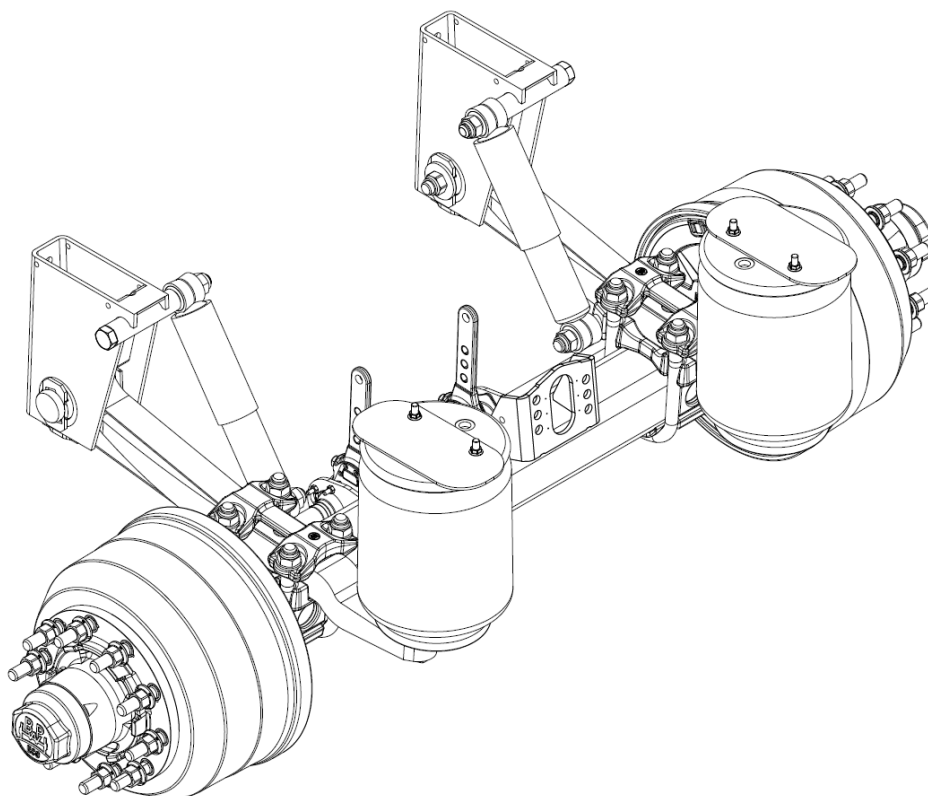
only. The hangers therefore need to be gusseted accordingly.

With trailer frames that are prone to twisting, an elastic and torsionable reinforcement of the air suspension hangers should be fitted.

Depending on the design of the trailer, and the type of suspension fitted, an airbag top plate, a top plate with a spacer, or a spacer alone will need to be welded to the frame for the mounting of the airbag.

## Important – Read First

- It is the trailer manufacturer's responsibility to correctly design and install all allied and required components such as gusseting and support brackets.
- All the notes, diagrams and illustrations in this document are designed to illustrate technical design and installation requirements.
- We explicitly state that these instructions are solely to be understood as examples for easier installation. These instructions are to be read in conjunction with the Suspension Assembly Drawings supplied with the Suspension Kit
- Please observe all tolerances as reflected on both the Assembly Drawings and the diagrams in these Assembly Guidelines.
- Always ensure that there is at least 25 mm clearance between the inflated airbag and the tyres once the airbags are installed and inflated to the maximum operating pressure of the suspension. If this is not the case please contact BPW Transpec Pty Ltd immediately.
- In all cases refer to the Suspension Assembly Drawings and Piping Drawings as included with your Suspension Kit. Should such Suspension Assembly Drawings and Piping Drawings not be included please contact BPW Transpec Pty Ltd immediately.
- The maximum installed suspension slope is  $\pm 1$  degree, measured when the suspension is set to its design ride height and the trailer is sitting on level ground.



Victoria (Head Office)	New South Wales	Queensland	Western Australia
1 Cherry Lane NORTH LAVERTON VIC 3026 TELEPHONE: 03 9267 2444 FACSIMILE: 03 9369 4826	10 Squill Place ARNDELL PARK NSW 2148 TELEPHONE: 02 8811 7000 FACSIMILE: 02 8811 7050	Cnr Archerfield Road & Bernoulli Street DARRA QLD 4076 TELEPHONE: 07 3217 0877 FACSIMILE: 07 3217 0230	1021 Abernethy Road HIGH WYCOMBE WA 6057 TELEPHONE: 08 9479 5822 FACSIMILE: 08 9479 6922

## Suspension Identification

**BPW Air Suspensions** are available in two different series in either **overslung** (spring above axle) or **underslung** (spring below axle) configuration and with either **alignable hanger brackets** or **fixed hanger brackets (alignment plates)** to facilitate wheel alignment.

### Series AL II

- **70 mm** wide single leaf trailing arms.
- **Overslung** with u-bolts facing upwards.
- **Underslung** with u-bolts facing downwards

**Alignable Hanger Brackets** (Please see **Step 5** on **Page 12** for complete wheel alignment details):

Standard Series **AL II** air suspensions are supplied with alignable hanger brackets to facilitate wheel alignment. Here a flat slotted washer is fitted around the spring eye pivot bolt. This washer contains an inclined slot to move the pivot bolt frontwards or rearwards. To align the axles loosen the spring eye pivot bolt and slide both inner and outer slotted washer in the required direction to shift the axle. **Once alignment is correct ensure that both inner and outer slotted washers are at the same height and re-torque the spring eye pivot bolt.**

**Fixed Hanger Brackets (alignment plates)** (Please see **Step 5** on **Page 12** for complete wheel alignment details):

Special order **AL II** air suspensions are supplied with alignment plate style mechanisms for axle alignment. Alignment plates are flat plates of steel, with a locating pin welded in one side, which fit between the trailing arm spring and the spring pad. Loosen u-bolts to shift axle and re-torque u-bolts. **Once alignment is correct weld tracking plates to spring pads only.**

### Axle Lifts

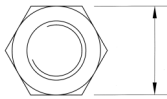
**BPW Air Suspensions** are also available with various axle lift mechanisms to suit the suspension series or trailer configuration. Please refer to the **Suspension Assembly Drawing** as supplied with your **Suspension Kit**. Should there be any queries please contact **BPW Transpec Pty Ltd** for assistance.

## Airlight II Spring Eye Pivot Bolts

Please note that **BPW Airlight II (AL II) Series Air Suspensions** changed from an M30 Spring Eye Bolt to an M24 Spring Eye Bolt in September 2008. They can be differentiated by the M30 bolt requiring a 46 mm spanner (SW46) and the M24 bolt requiring a 36 mm spanner (SW36). Be aware that the AL II air

suspension with the M24 Spring Eye Bolt requires a reduced Torque Setting of **650 Nm (480 ft/lbs)**.

For a complete list of all Torque Settings please see the Torque Table on **Page 16**.



← **46 mm (SW46) M30 Spring Eye Bolt - Torque Setting 1000 Nm (740 ft/lbs)**

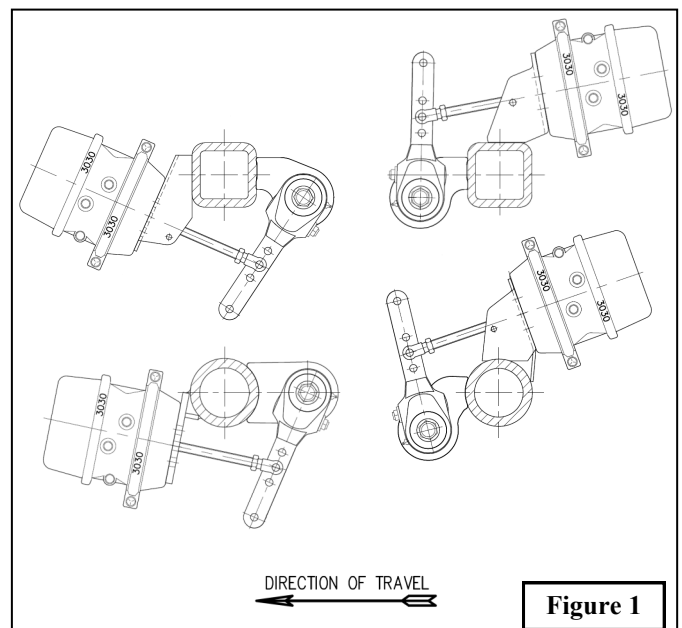


← **36 mm (SW36) M24 Spring Eye Bolt - Torque Setting 650 Nm (480 ft/lbs)**

## Axle Orientation

Refer to **Figure 1**

To determine the orientation of the axle, refer to the **Suspension Assembly Drawing** supplied with the kit, and note that BPW axles must be fitted such that, when the brakes are applied, the camshafts rotate in the same direction as the wheels do in forward motion.



**Figure 1**

# Step 1

## Attachment of Hanger and Airbag Mounts

Refer Figures 2 and 3

Please refer to the **Suspension Assembly Drawing** supplied with your suspension kit for the hanger and airbag mounting dimensions and, if applicable, the position of the remote shocker mount and the catchstrap mounting bolts.

When BPW Airbag Suspensions are supplied in conjunction with BPW Axles, the weld-on seats are supplied fitted to the axles. If the BPW Airbag suspension is supplied for use in conjunction with non-BPW axles, **BPW Transpec Pty Ltd will not** weld the axle seats to the axles, and **will not** cover any faults or failures with the axle and/or the axle/suspension connection.

Refer to **Figures 2 and 3** for examples of the minimum requirements for the hanger and airbag attachments.

- Neither the hanger gussets nor the airbag support gussets are supplied with the suspension kit. They are to be manufactured by the trailer builder to suit the trailer design.
- Weld the hanger and airbag mounts to the trailer frame. **Observe the welding tolerances as shown in Figures 2 and 3.**
- The cross bracing, chassis and gusset component dimensions depend upon the respective trailer type and its intended field of application. The examples shown in **Figure 2 and 3** are for illustrative purposes only. It is the trailer manufacturer's responsibility to correctly design and install all allied and required componentry such as gusseting and support brackets.
- If the trailer manufacturer should prefer to attach the hanger

and airbag mounts via a bolted connection, please consult **BPW Transpec Pty Ltd.**

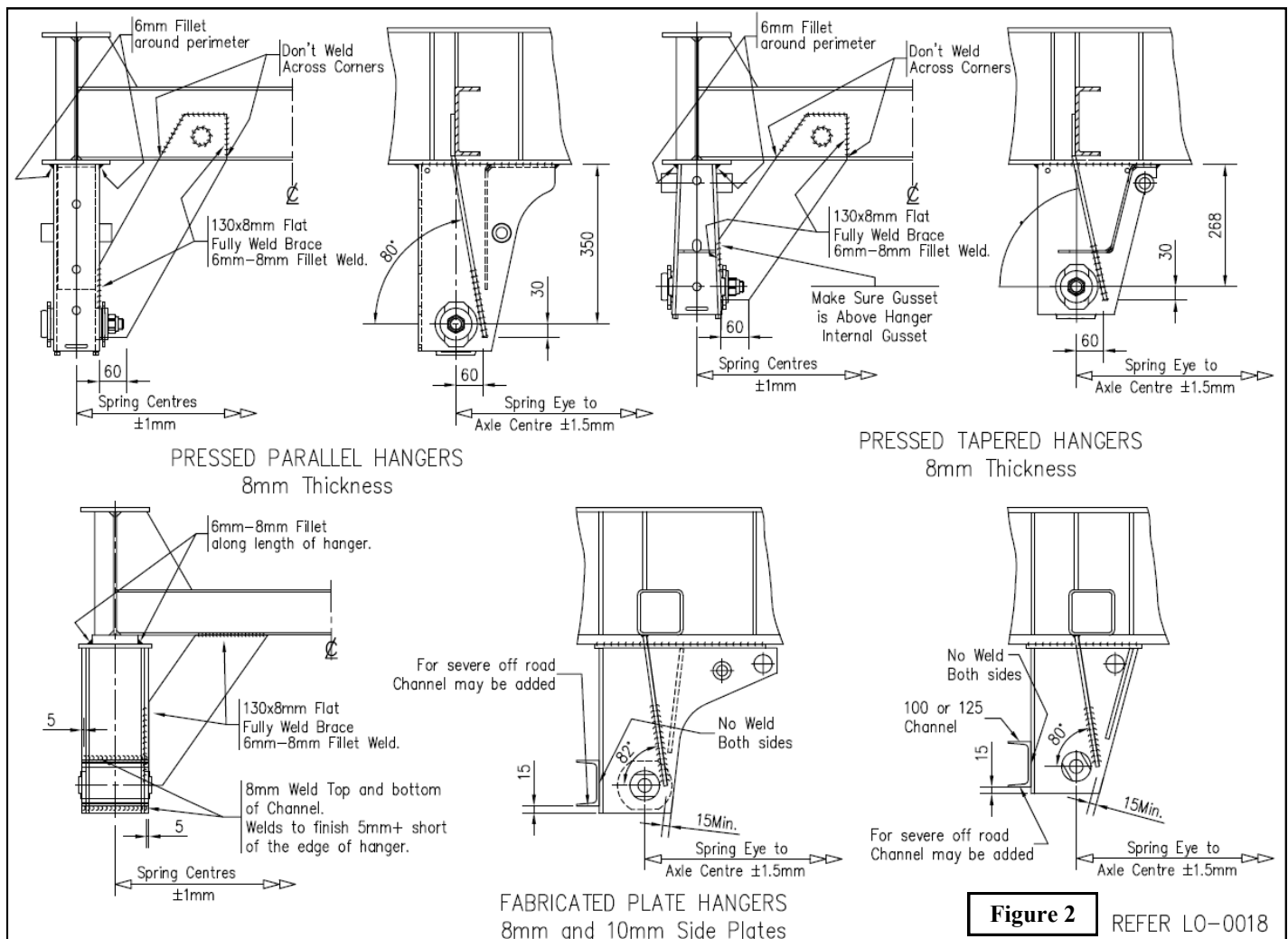
- Square hollow tube frames can also be used to mount BPW airbag suspensions. The tube dimensions are to be determined by the trailer manufacturer to ensure that the frame is of sufficient strength when mounted to the trailer.

## Hanger Bracket Gusseting

In order for the hanger brackets to receive the correct support the gusseting should comply with the minimum requirements (please refer to **Figure 2** for examples).

## Important considerations when welding mild steel hanger brackets

- The trailing arm springs, air bags and pneumatic piping should be protected against sparks and weld spatter during all welding work. **The earth terminal must under no circumstances be attached to the trailing arm or hub.**
- BPW Air Suspension hanger brackets are made of weldable grade mild steel.
- The minimum welding requirements are – M.I.G. process, low Carbon (0.1%) wire, with CO2 or CO2-Argon shielding gas, to suit mild steel.

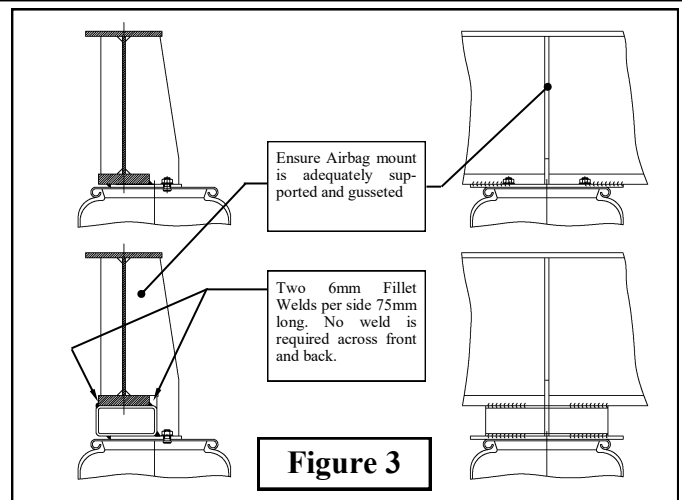


## Airbag Gusseting

Refer **Figure 3**

In most cases airbag top mounting plates need to be mounted offset with regards to the chassis rail beam in order to obtain the required clearance for the airbag, refer to the **Suspension Assembly Drawing** supplied with the **Suspension Kit**. With offset airbags, bending forces become significant which have to be reacted by gusset plates welded into the main beam.

**It is important that the mounting plate present a flat surface for the airbag to mount to. After welding ensure that the top plate is still flat as the welding process may bend the mounting plate. It is advisable to tack the gusset into position before welding the airbag mounting plate to the chassis, to prevent the mounting plate from deforming due to the welding process.**



## Step 2

### Air Suspension Catchstraps (Axle Restraints)

- **BPW Transpec Pty Ltd** recommends that all BPW Air Suspensions are fitted with axle restraints.
- BPW AL II Series Air Suspensions are supplied with webbing

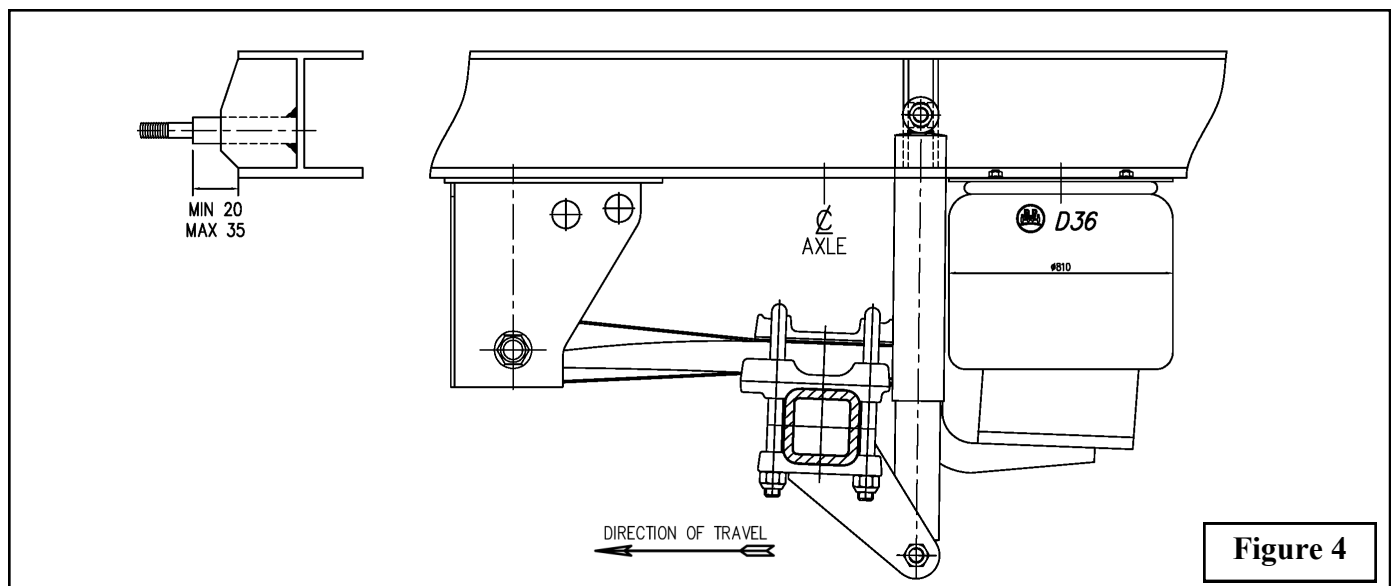
sling axle restraints as standard; cable catchstrap axle restraints are available as an option (see Series O/OM/OT Air Suspension Instructions for Installation Instructions).

### Remote Shock Absorber Mounts

Refer **Figure 4**

Some air suspension designs call for a remotely mounted top bolt for the shock absorber. Ensure that the remote shock absorber mount is sufficiently gusseted.

Please note that the diagram is for illustrative purposes only. The bolt supplied has a 40 mm x 40 mm square shank and in most cases must be cut to length and installed as required; refer to the **Suspension Assembly Drawing** as supplied with the **Suspension Kit**. Different lengths of bolts are available, and a bolt with a 40 mm round shank is also available.



## Step 3 Suspension Assembly and Brake Chamber Installation

All fastener threads should be coated with anti-seize paste prior to assembly

### Step 3.1 Axle Sub-assembly

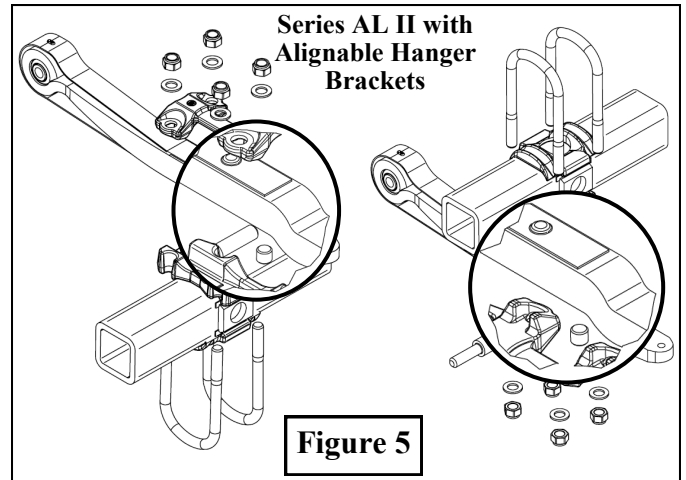
Should your axle and suspension be supplied unassembled then you will need to fit the trailing arm springs to the axles via the spring seats and u-bolts. Always refer to the **Suspension Assembly Drawing** as supplied with the **Suspension Kit**.

#### Suspensions with Alignable Hanger Brackets

Refer **Figure 5**

- Alignable Hanger Bracket equipped suspensions do not require an axle alignment plate.
- Ensure that the locating pin (centre bolt) is fitted into the corresponding holes in the spring trailing arm and spring seat.
- Tighten up the U-bolts to hold the assembly in place.
- Tension the M24 U-bolt nuts with a tensioning wrench to **650 Nm (480 ft/lbs)** (see Notes Page 16).

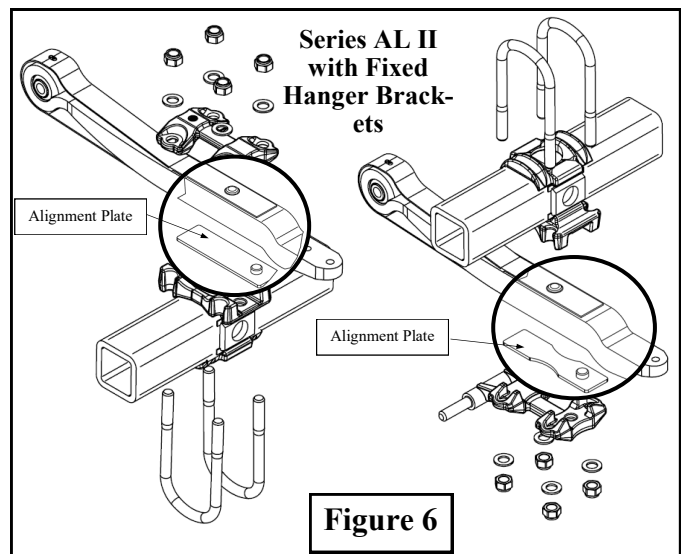
For the AL II Air Suspension there are two types of Sub-assemblies available. Suspensions with Alignable Hanger Brackets contains small dowels (centre bolts) to position the trailing arm spring to the axle where as the Sub-assembly for Fixed Hanger Brackets contains Alignment Plates (Alignment Procedure see Step 5 on Page 12).



#### Suspensions with Fixed Hanger Brackets (Alignment Plates)

Refer **Figure 6**

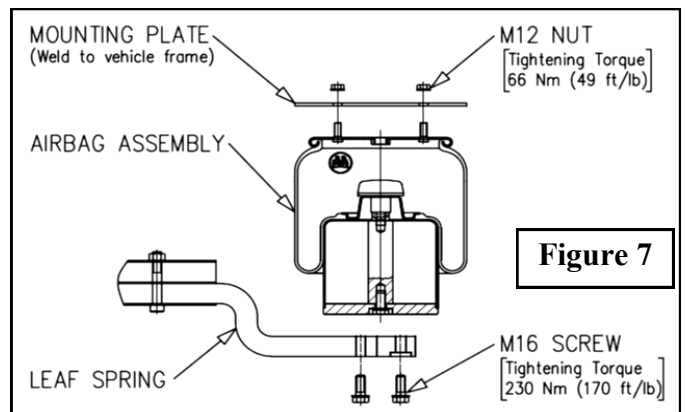
- Please note that axle alignment plates are not fitted if the suspension hanger has the alignment feature.
- Align the spring centre bolt with the middle of the axle and through the hole in the alignment plate (heavy duty dual leaf spring trailing arm). Align pin on alignment plate with hole in the spring trailing arm.
- Tighten up the U-bolts to hold the assembly in place.
- There is no need to torque the U-bolts at this stage, as they should be torqued after the axles are aligned on the trailer (see Notes Page 16).



### Step 3.2 Airbag Sub-assembly

Refer **Figure 7**

- Please refer to the **Suspension Assembly Drawing** as supplied with your **Suspension Kit** for the required **Airbag Offset**, prior to fitting the Airbag onto the trailing arm spring.
- Fit the Airbag as per **Figure 7**, and tighten fasteners to the required torque – M16 airbag lower screws to **230 Nm (170 ft/lbs)** and the M12 airbag upper mounting nuts to **66 Nm (49 ft/lbs)**.



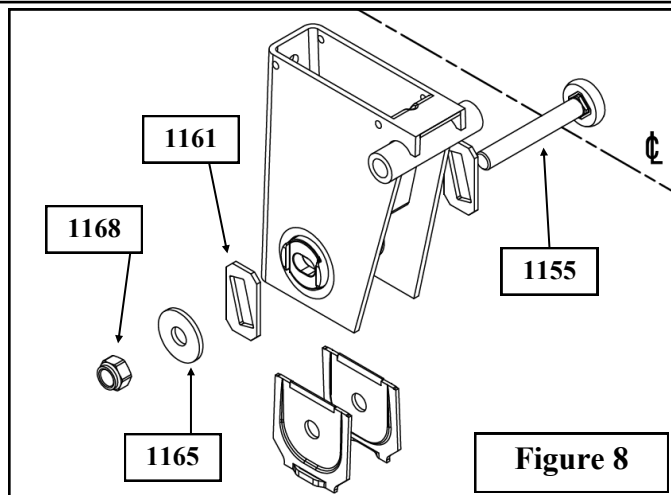
### Step 3.3

## Hanger Sub-assembly

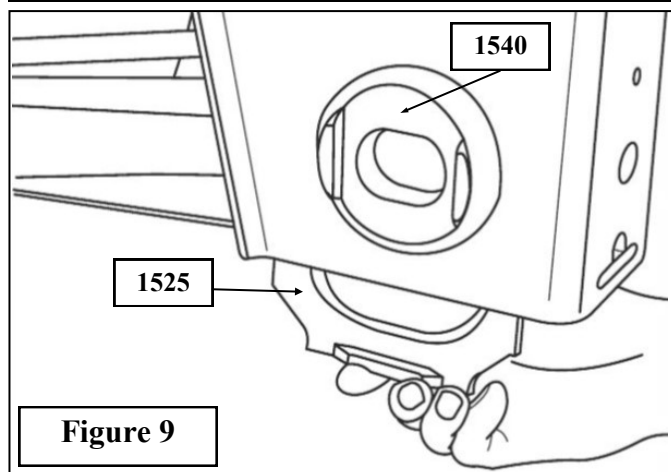
### Alignable Hanger Brackets

Refer **Figures 8 and 9**

- Introduce the eye of the spring trailing arm into the hanger bracket (in the case of single leaf spring – include the catch plate)
- Slide in the shaped wear plates (item N° 1525) with the arrester lug facing down and out. (see **Figure 9**). Please note that there are two different types of shaped wear plates, required for different types of hanger brackets. Refer to **Page 13** for more details.
- Make sure the holes in the hanger bracket, shaped wear plate and spring trailing arm bush line up.
- Cover the shank and thread of the spring eye bolt (item N° 1155) with grease.
- Fit the outer slotted washer (item N° 1161) to the spring bolt with the upper part of the slot facing forward and insert the spring eye bolt into hole from the outside of the trailer.
- Fit the inner slotted washer (item N° 1161) with the upper part of the slot facing forward to be in line with the outer slotted washer.
- Fit the Ø24 mm washer (item N° 1165)
- Apply grease or anti-seize paste to both the exposed thread of the spring eye bolt (item N° 1155) and the outer surface of the washer (item N° 1165) where it mates with the M24 locknut (item N° 1168).
- Fit the M24 locknut (item N° 1168). The spring eye bolts are generally installed with the nuts to the outside. This makes the spring eye bolt nuts easily accessible for ongoing maintenance. Should the end user prefer to service from a pit the spring eye bolt can be installed with the nut on the inside of the trailer.
- Have the suspension at the correct ride height position and pre-tighten the nuts so that the slotted washers are centralized and



**Figure 8**



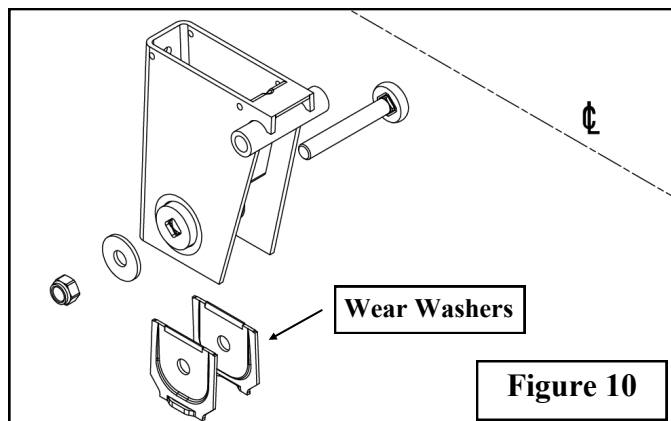
**Figure 9**

still movable. The suspension is now ready for alignment, please refer to **Step 5** on **Page 12** for more details.

### Fixed Hanger Brackets (Alignment Plates)

Refer **Figure 10**

- Introduce the eye of the spring trailing arm into the hanger bracket (in the case of single leaf spring – include the catch plate)
- Slide in the shaped wear plates with the arrester lug facing down and out. (see **Figure 9**). Please note that there are two different types of shaped wear plates, required for different types of hanger brackets. Refer to **Page 13** for more details.
- Cover the shank and thread of the spring eye bolt with grease and insert the spring eye bolt into the hole from the inside of the trailer.
- Fit the washer and apply grease or anti-seize paste to both the exposed thread of the spring eye bolt and the outer surface of the washer where it mates with the locknut.
- Fit the M24 locknut. The spring eye bolts are generally installed with the nuts to the outside. This makes the spring eye bolt nuts easily accessible for ongoing maintenance. Should the end user prefer to service from a pit the spring eye bolt can be installed with the nut on the inside of the trailer.
- Tighten all nuts, except U-bolt nuts, to the specified torques as per **Page 16**.



**Figure 10**

- The spring eye bolt must only be tightened to the required torque (650 Nm) after the suspension has been set to the **correct ride height**. Refer to information on ride height as reflected on the **Suspension Assembly Drawing** supplied with the **Suspension Kit**. The suspension is now ready for alignment, please refer to **Step 5** on **Page 12** for more details.

## Warning

The maximum permissible paint thickness on the bearing surfaces between the bosses in the hanger bracket (Item N° 1540) and the wear plates (Item N° 1525) is 30µ (30 microns). The same specification applies to the spring eye bolt (Item N° 1155), spring eye bolt nut (Item N° 1168) spring eye bolt washer (Item N° 1165) and the slotted washers (Item N° 1161). If the hanger

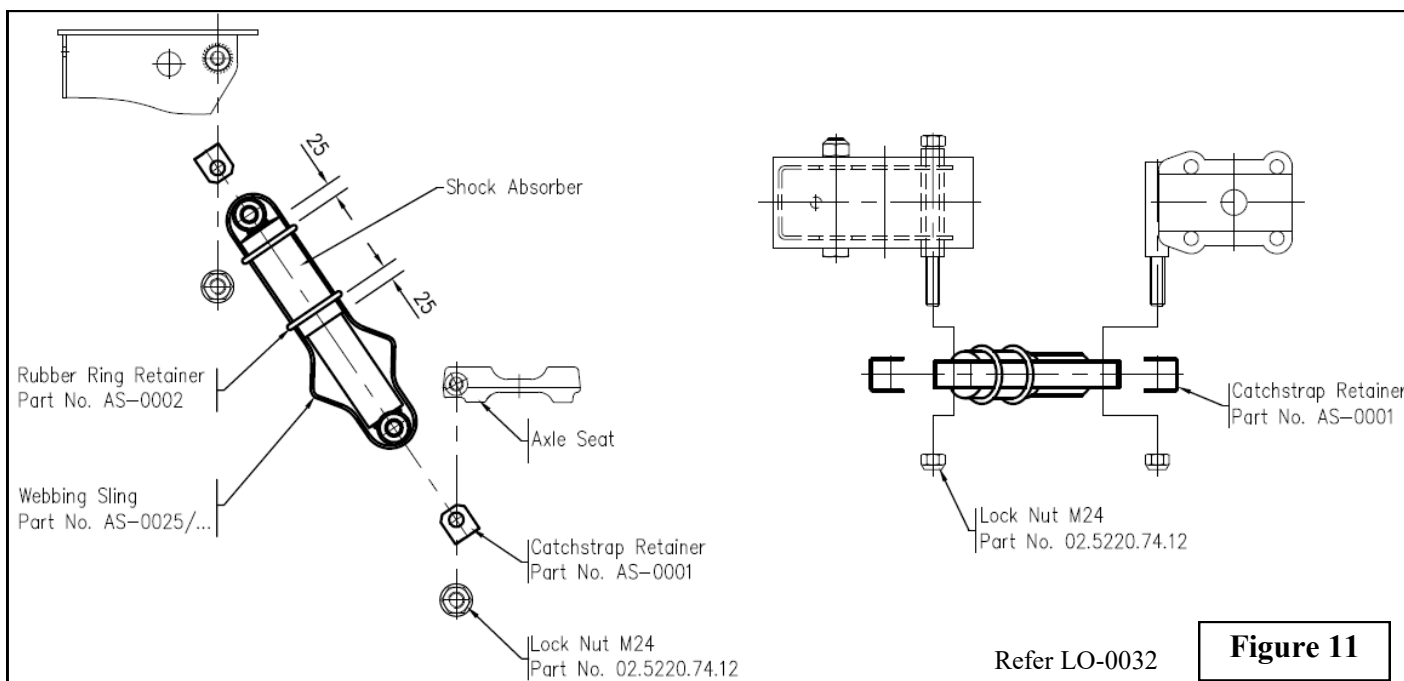
brackets and components are to be installed and painted before the spring trailing arms are fitted then all these surfaces need to be masked off. If the paint thickness in these areas is too thick there is a danger of the spring eye bolt loosening. This warning also applies should the hanger bracket and components be galvanised.

## Step 3.4 Installing Webbing Sling Axle Restraints

Refer Figure 11

- Webbing Slings are fitted around the shock absorber and are held in place with the Catchstrap Retainers (Part No. AS-0001 and AS-0002) refer to **Figure 11**.

- Please refer to the **Suspension Assembly Drawing** for the correct Webbing Sling length.
- Fit the shock absorbers with the webbing slings to the assembly
- Installation of Cable Catchstraps refer to **Assembly Guidelines Air Suspensions for Series O/OM/OT Step 3.4**.



**Figure 11**

## Step 3.5 Brake Chamber Installation Drum Brakes

Refer to **Figure 12**

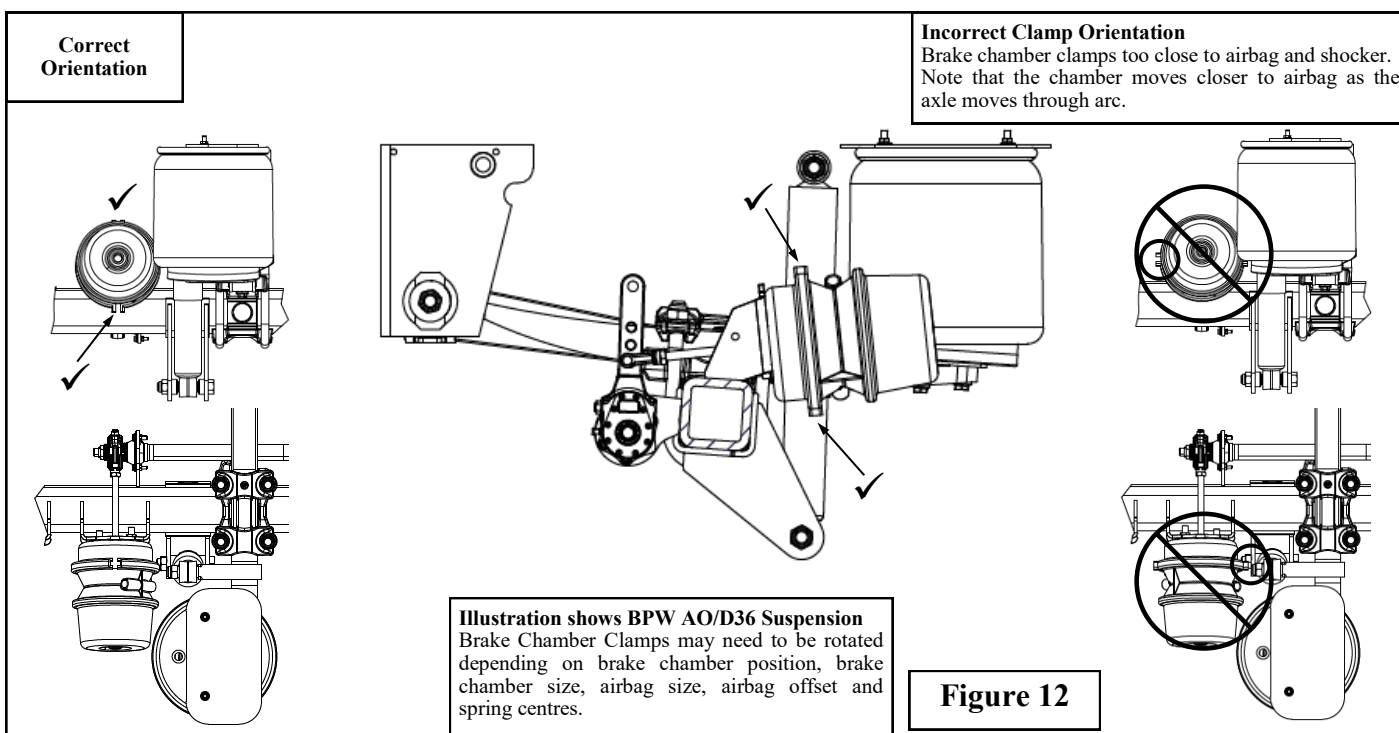
When installing Brake Chambers onto BPW Air Suspension Axles, it may be necessary to rotate the booster clamps to maximise clearance to the airbags (and in some cases the shock absorbers) -

(refer to **Figure 12**). If in doubt please contact **BPW Transpec Pty Ltd**.

Note that the airbag diameter increases considerably when fully inflated (as compared with the deflated diameter). Please refer to the **Suspension Assembly Drawing** supplied with the **Suspension Kit** for the maximum inflated airbag diameter.

### Important

Remove the vent plug at the lowest point of the brake cylinder prior to the vehicle entering service.



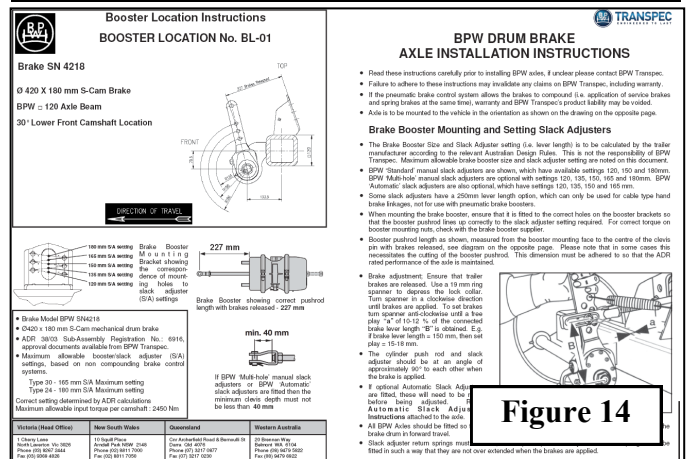
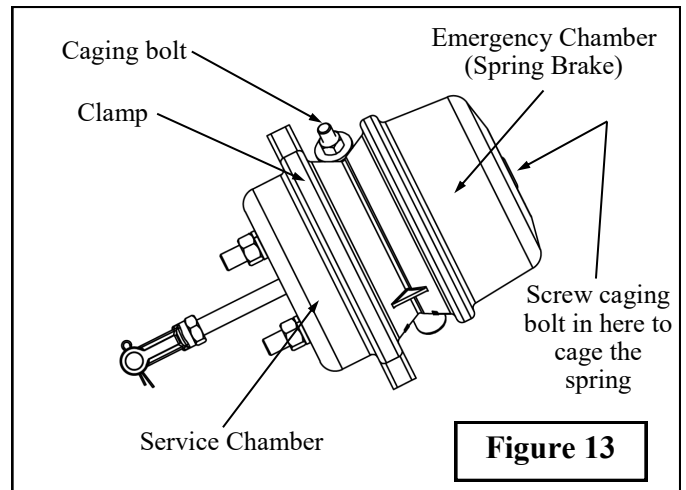
**Figure 12**



## Warning

Refer to Figures 13 and 14

- The caging bolt supplied with the brake chamber **must** be used to cage the spring in the emergency chamber - (refer to **Figure 13**)
- Before loosening brake chamber clamps, ensure** that there is no air pressure in the service and emergency chambers and that the spring in the emergency chamber is **caged** i.e. **no air in brake chambers and the brakes must be released.**
- Always ensure that there is at least 25 mm clearance between the inflated airbag and the tyres once the airbags are installed. (Note tyres are assumed to be 11R22.5 size)
- After rotating the clamps ensure they are properly re-seated.
- After re-tightening the clamps, check for air leaks. The emergency chamber spring can now be uncaged.
- Tightening torque for booster nuts: 180<sup>+30</sup> Nm**
- Refer also to the setting procedure for the brake booster slack adjuster positioning and brake adjustment (Figure 14). The applicable BL Drawing is supplied with the axles/ suspension kit.
- The brake booster/ slack adjuster position must be determined as part of the trailer builders brake variant.



## Disc Brakes

Refer to Figures 15 and 16

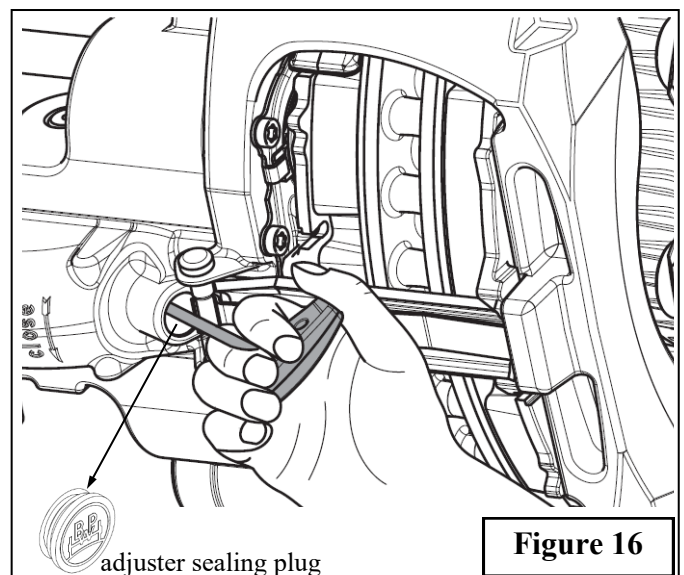
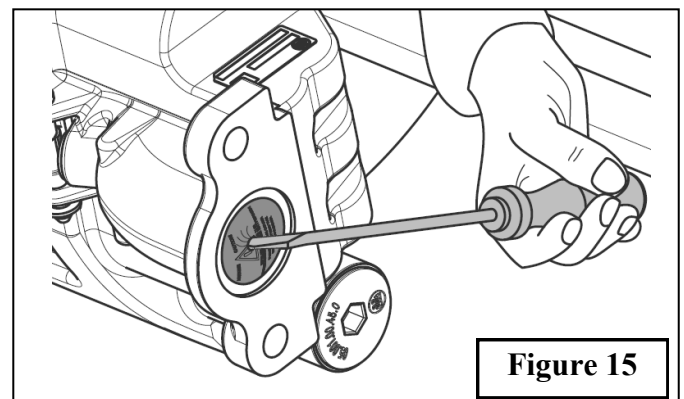
## Warning

- Only use brake cylinders suitable for disc brakes (with inner sealing)!
- Do not pressurise the brake cylinder unless it is mounted to the brake!
- Do not use grease containing molybdenum disulphate!

## Installation and Setting

- Remove the sealing plug (Figure 15).
- Make sure the caging bolt is mounted to the brake cylinder so that the push rod is pulled inside the cylinder.
- Position the brake cylinder and install it using new mounting nuts. **Tightening torque: 180<sup>+30</sup> Nm.**
- Remove the caging bolt.
- Determine the calliper is sliding freely on the seat.
- Using a torx wrench (T25), depress the return spring and turn clockwise until it clicks 3 to 4 times. (Figure 16)
- Actuate the brake 5 to 10 times with a force of approximately 2 bar.
- Push the sliding calliper in the axle direction. The play exhibited at this time must be between 0.5 and 1 mm. Adjustment is correct if play is within this tolerance.
- Reinsert the adjuster sealing plug.
- The brake booster size must be determined as part of the trailer builders brake variant.

**Note:** The installer of the brake booster must make sure the hose/airline are of suitable length.



## Step 4 Levelling Valve Installation and Air Suspension Piping

Please refer to the **Air Suspension Piping Schematic Drawing** as supplied with the **Suspension Kit** prior to installing the Levelling Valve (eg. PK30).

### Step 4.1 Levelling Valve Installation

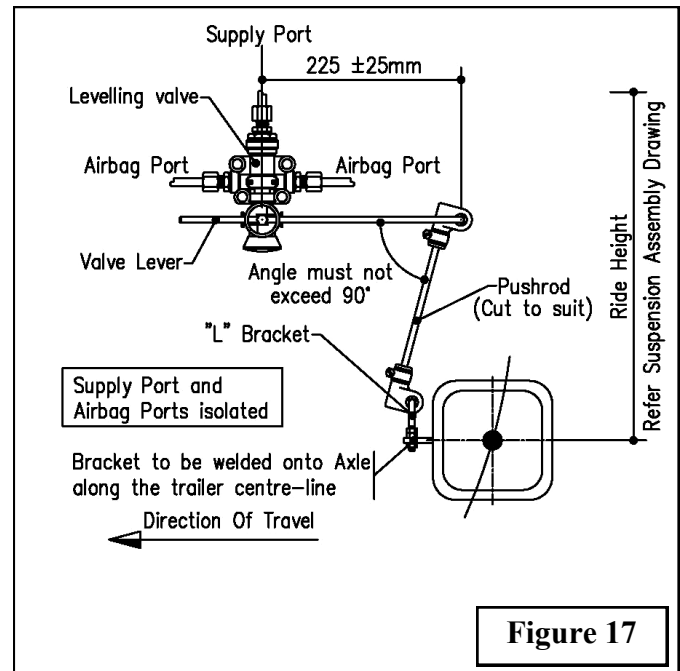
Refer **Figure 17** and **18**

BPW Air Suspensions are equipped with a single levelling valve (height control valve) which regulates the airbag pressure according to the respective load, thereby holding the trailer at a constant height. The levelling valve is bolted to the trailer frame and connected to the axle via push rods.

The trailer manufacturer is required to fabricate and install an appropriate mounting bracket for the levelling valve. **The push rods are attached to the centre of the axle along the trailer centre line**, via a bracket which is supplied with the **Suspension Kit** and is to be welded to the axle by the trailer manufacturer to coincide with the levelling valve installation. The levelling valve is normally installed on the centre axle of a tri-axle group and on the rear axle of tandem axle groups. Under special circumstances the levelling valve may be fitted to either the front or rear axles, e.g. if an axle lift is fitted or in the case of extreme vehicle inclinations.

**Operation of the levelling valve showing air flow in different modes (Figure 18).**

**Note:** Valve lever / pushrod angle requirements: If the angle between the valve lever and pushrod is greater than  $170^\circ$  at the

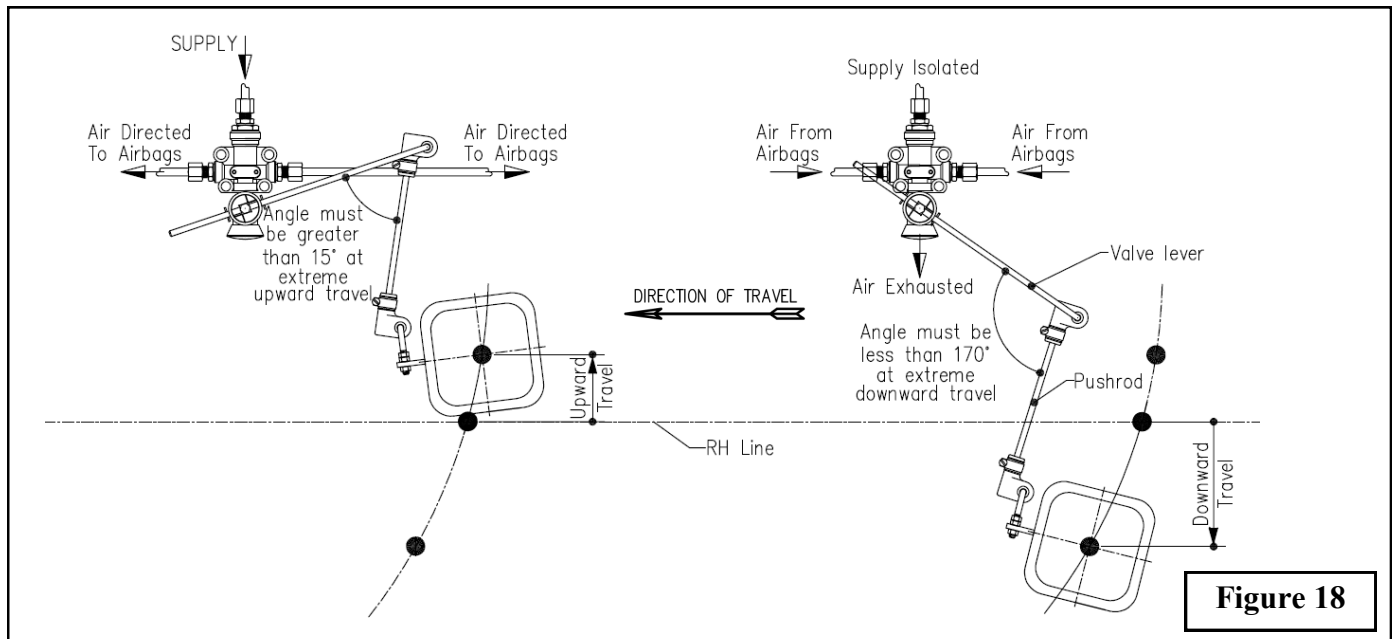


**Figure 17**

extreme downward travel, the assembly may reverse, causing the air suspension to deflate

It is recommended that the levelling valve be positioned along the centre line of the vehicle in front of the axle (refer **Figure 15**), and with the exhaust port facing downwards. The valve lever needs to be adjusted to a length of 225mm  $\pm$  25mm. If there is insufficient space to mount the levelling valve in front

of the axle, it may be mounted behind the axle. However, extreme care should be taken to ensure that the angles between the valve lever and the push rod are within those listed in **Figure 16**.



**Figure 18**

## Step 4.2 Piping

Refer **Figure 19**

It is recommended that the brake control system be installed prior to piping the suspension. Take care when installing the brake boosters – referring to the installation instructions on **Page 9**. Please refer to the **Airbag Piping Schematic Drawing** supplied with the **Suspension Kit** for the piping layout. Complete the piping, drawing supply air from one of the brake system air tanks via a pressure protection valve (NB this is a legal requirement) supplied with the airbag suspension piping kit. **Take care that the pressure protection valve is installed correctly, with the arrow pointing in the direction of flow, i.e.: from the brake system air tank to the suspension air tank.** Also ensure that the filter is installed, with the removable cap facing downwards. Thoroughly check the suspension for air leaks..

## Step 4.3 Levelling Valve Orientation

Charge up the trailer's brake control system with air, ensuring the air suspension air tank is charged up (i.e. by depressing the drain cock in the tank). Ensure correct operation of the levelling valve lever, i.e. when you manually move the valve lever upwards, the airbags should inflate and, when manually moving the valve lever downwards, the airbags should exhaust through the levelling valve. (Refer **Figure 18**).

If the levelling valve is operating in reverse, remove the valve lever, rotate the valve shaft by 180 degrees, then re-install the valve lever and re-check.

## Step 4.4 Set-up of Ride Height

Refer to the **Suspension Assembly Drawing** supplied with the kit for the correct ride height setting. Set the axle to the correct ride height and set the valve lever in the neutral position, as shown in **Figure 17**.

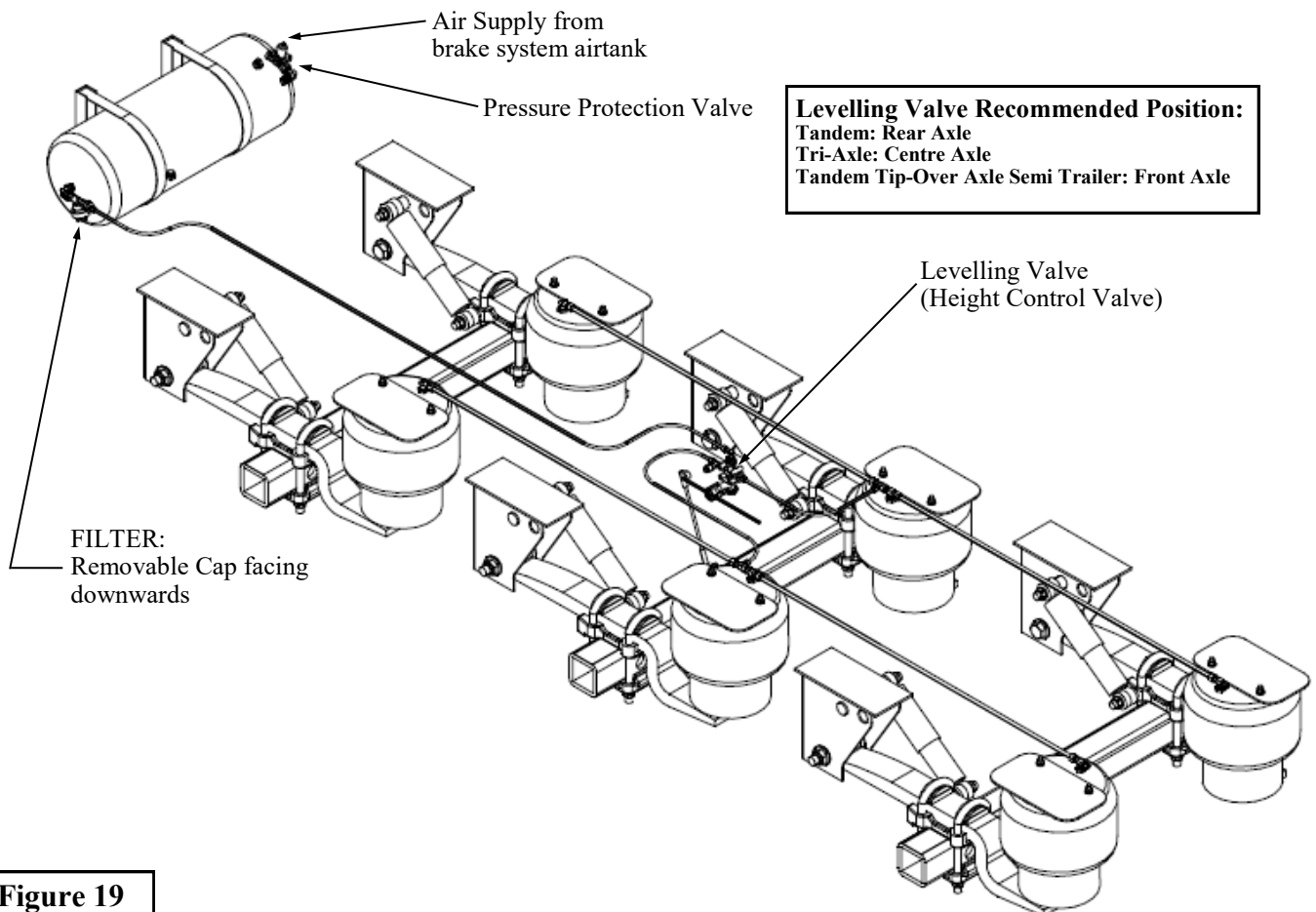
Install the "L" bracket onto the axle and measure the required push rod length, cut to suit if necessary. Install the push rod, ensuring that it is seated firmly home into the rubber boots. Fine adjustments to the ride height can be carried out using the fastening nuts attached to the "L" bracket.

## Step 4.5 Levelling Valve Operation

The angles between the levelling valve lever and push rod must be as specified in **Figure 17**. Check angles in the extreme positions as shown in **Figure 18** by disconnecting the push rod boot from the "L" bracket and manually raising and lowering the suspension via the levelling valve. At the extreme upward and downward positions reconnect the push rod boot through the "L" bracket while simultaneously checking the angles. Ensure that the airbags are correctly formed over the housing (piston). **If the airbags are pinched or creased between the piston and top plate, inflate the airbags manually until they are correctly formed.**

### Typical Air Suspension Piping Layout.

For more information please refer to the **Piping Schematic Drawing** as supplied with the **Suspension Kit**.



**Figure 19**

## Step 5 Axle Alignment

### Alignment Procedure: Alignable Hanger Brackets

Refer **Figure 20**

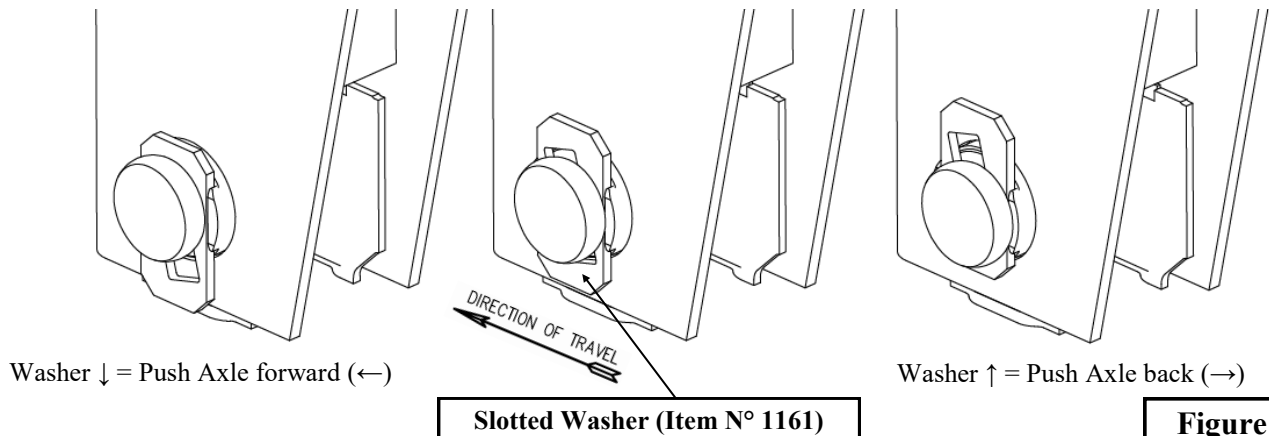
- Have the suspension at the correct ride height position and pre-tighten pivot bolt nut so that the slotted washers are centralized and still movable.
- Align axle by knocking slotted washers up or down thus moving

ing the spring/axle assembly in the desired direction. Maximum spring/axle movement to front or rear from the central slot position is **5 mm**.

- **Important:** both inner and outer slotted washers (item N° 1161) **must** be at the same height.
- After the axle is aligned tighten the pivot bolt nut with a tension wrench to **650 Nm (M24 nut – SW36)**. The suspension **must** be at the correct ride height when the nut is tightened.

### Series AL II with Alignable Hangers

After alignment tighten the pivot bolt nut to 650 Nm (at correct ride height)



**Figure 20**

If the suspension is supplied with fixed hanger brackets (alignment plates) then the alignment of the axles is performed via the Alignment Plates.

### Alignment Procedure: Fixed Hangers

Refer **Figure 21**

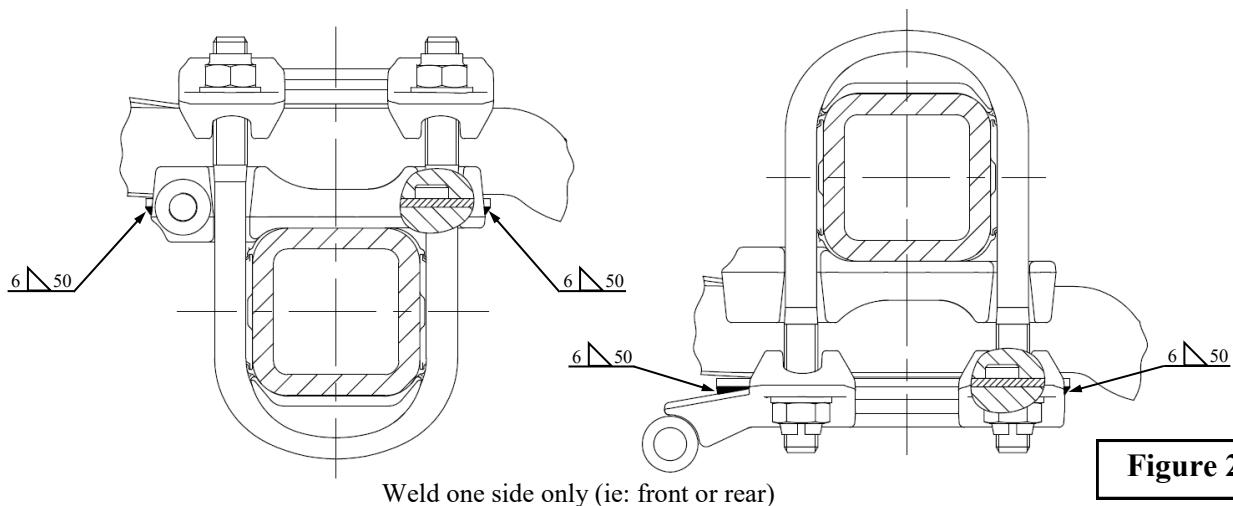
- Before starting with wheel alignment ensure that the suspension is set to the correct ride height. Please refer to the **Suspension Assembly Drawing** supplied with your **Suspension Kit** for ride height specifications.
- Align the axles using your preferred technique. Should the

axles need adjustment, loosen the u-bolts and move the axle backwards or forwards to obtain the correct alignment.

- Tighten the U-bolts as follows: Nip up all of the U-bolt nuts, ensuring that the nuts are sitting flush on the bottom plate. Then tighten the nuts to the prescribed torque in several stages on alternate sides. (i.e. one U-bolt at a time). Ensure that the U-bolt threads and the bearing face of the nuts are lubricated with anti-seize.
- Re-check the alignment after torquing the U-bolts and, if the alignment is acceptable, weld the alignment plates to the axle seat as shown in **Figure 21**.

### Series AL II with Fixed Hangers

After alignment weld alignment plate to spring seat with 6 mm fillet weld (length 50 mm).



**Figure 21**

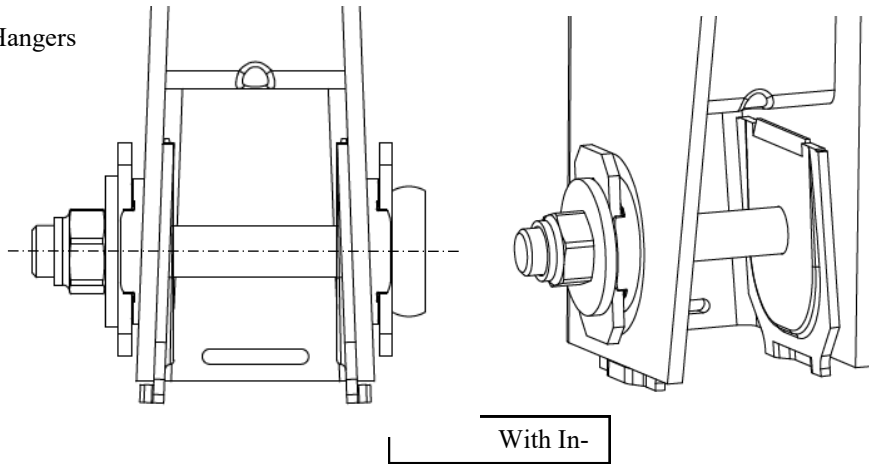
## Hanger Bracket Wear Washers

Refer **Figure 22**

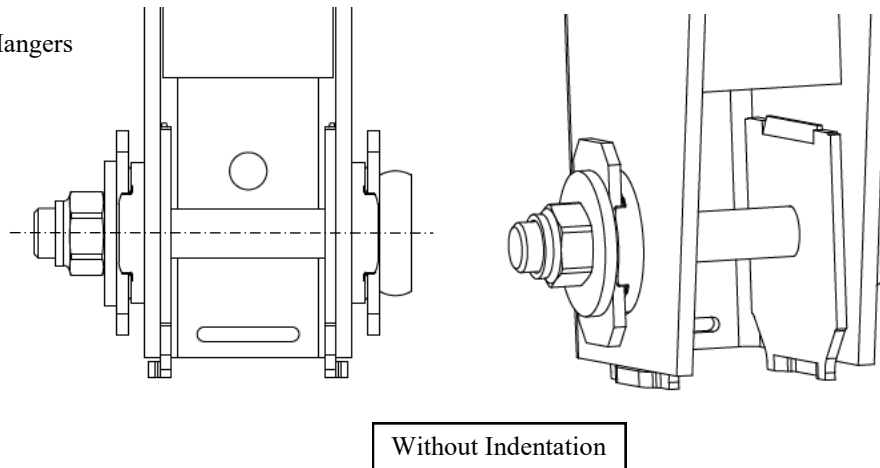
The various designs in Airlight II (AL II) Series Air Suspensions with steel hanger brackets mean there are different types of wear washers.

- Wear washers with an indentation are required for hanger brackets with angled (tapered) side walls.
- Wear washers without an indentation are used for hanger brackets with parallel side walls.

Tapered Hangers



Parallel Hangers



**Figure 22**

## Installing and Setting BPW Eco-Master Automatic Slack Adjusters

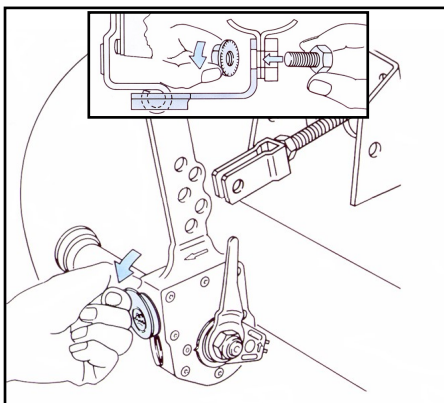
BPW Eco Master automatic slack adjusters are designed to give the end user the very best in both braking performance and lining life. They constantly maintain the ideal gap between the drum and the brake lining

to ensure safe and reliable brake application.

The automatic slack adjusters are self regulating rather than self adjusting. To this end the automatic slack adjusters need to be correctly set initially and after each change of linings or brake drum.

2

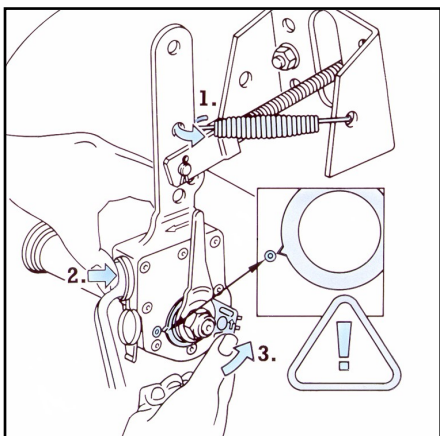
If the BPW Eco Master automatic slack adjusters are not already fitted to the axle, fit the anchor brackets and leave the nuts loose at this stage. If already fitted, **loosen these mounting nuts**. Also open the sealing cap



INSTALLING / SETTING

4

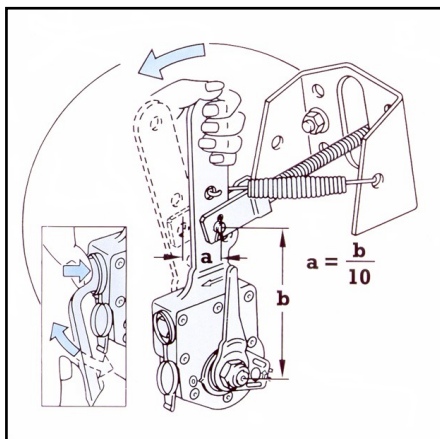
**Important** - Fit return spring to the slack adjuster (1), then while depressing the adjusting nut collar (2) rotate the location bracket (3) until the pointer aligns with the dowel on the slack adjuster. The booster must be in the "brakes released" position. If the anchor bracket does not allow the alignment of the location bracket as shown, then the anchor bracket will need to be repositioned.



SETTING

6

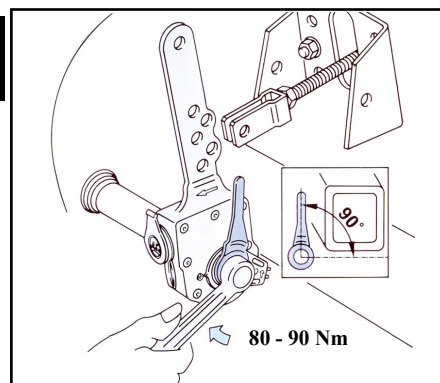
Adjust the brakes as per normal practice, ensuring free play, "a" of 10% to 12% of the slack adjuster lever length, "b". The booster must be in the "brakes released" position.



ADJUSTING

1

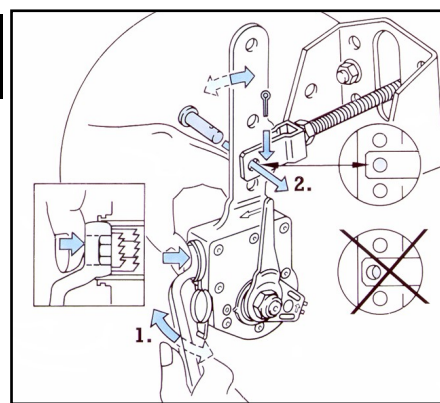
If the BPW Eco Master automatic slack adjusters are not already fitted to the axle, tighten the slack adjuster retaining nut to **80-90 Nm**, ensuring that the **brake wear indicator** is pointing vertically upward.



INSTALLING

3

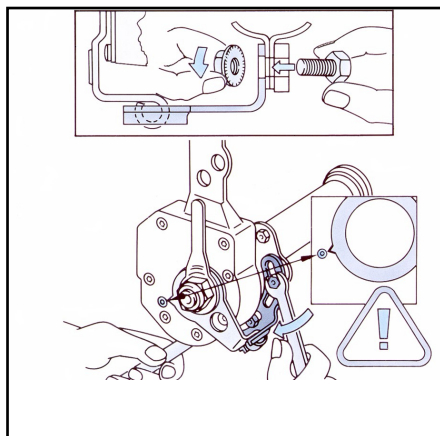
Turn the adjusting nut to line up the clevis pin to the relevant slack adjuster hole. Ensure that the pushrod has been cut to the correct length. The booster pushrod must be in the "brakes released" position. The pushrod and the slack adjuster must not be pulled or pushed to line up the clevis pin hole to the slack adjuster hole.



SETTING

5

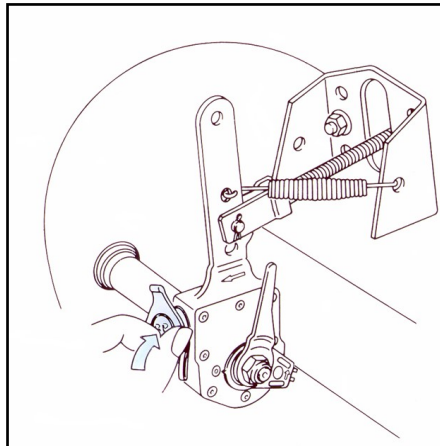
Tighten the anchor bracket fixing bolts to **25 Nm**, ensuring that the pointer remains aligned with the dowel on the slack adjuster. The booster must be in the "brakes released" position.



SETTING

7

Refit the sealing cap



FINISHED

## Step 6

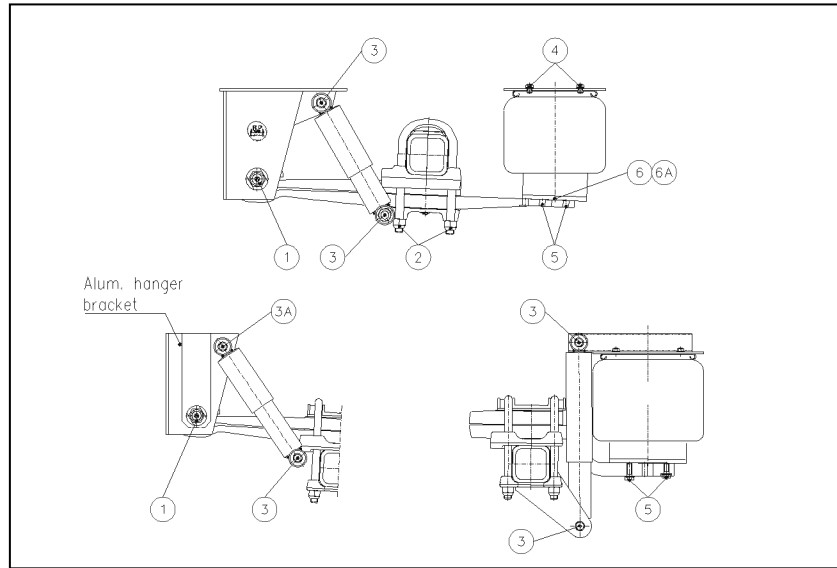
### Completion Checklist

Please refer to the **Suspension Assembly Drawings** as supplied with the **Suspension Kit**.

Section	Checks to be done	Tick
Attachment of hangers and airbag mounts	Welds	
	Hanger cross bracing / gussets	
	Airbag gussets	
Spring Eye Assembly	Torque at correct ride height	
	Inner wear washers fitted correctly	
Catchstrap installation	Welds	
	Gusseting (if required)	
	Fitment	
Axle installation	Axle orientation	
	Alignment plates (if fitted)	
	U-bolts torqued once axle aligned	
Brake chamber	Airbag / shock absorber clearance	
Levelling valve	Correct orientation	
	Correct lever / pushrod angles	
	Correct ride height settings	
Airbag piping (please refer to the <b>Piping Schematic Drawing</b> supplied with <b>Suspension Kit</b> )	Pressure protection valve fitment	
	Air filter fitment	
	Air leaks	
	Airbag pinching or creasing	
Alignment	Alignment plates welded	
	Spring eye bolt torque	
Correct fastener torque settings	Refer Page 16 for torque settings	



# Tightening Torques



Number	Attachment	Thread Type	Tightening Torque
1	Spring eye pivot bolt (Series O/OM/OT)	M30	1000Nm (740ft/lb)
1	Spring eye pivot bolt (Series AL II)	M24	650Nm (480ft/lb)
2	Spring U-bolt	M24	650Nm (480ft/lb)
3	Shock Absorber	M24	400-450Nm (295-335ft/lb)
3A	Shock absorber on aluminium hanger	M24	300-350Nm (225-260ft/lb)
4	Airbag – top plate nuts	M12	66Nm (49ft/lb)
5	Airbag – bottom plate screws	M16	230Nm (170ft/lb)
6	Airbag – bottom centre bolt	M16	230Nm (170ft/lb)
7	Diaphragm cylinder, two sided lift device	M16	180-210Nm (133-155ft/lb)

Please note that BPW Airlight II (AL II) Series Air Suspensions changed from an M30 Spring Eye Bolt to an M24 Spring Eye Bolt in September 2008. They can be differentiated by the M30 bolt requiring a 46mm spanner (SW46) and the M24 bolt requiring a

36mm spanner (SW36). Be aware that the AL II air suspension with the M24 Spring Eye Bolt requires a reduced Torque Setting of **650 Nm (480 ft/lbs)**.



← **46mm (SW46) M30 Spring Eye Bolt - Torque Setting 1000 Nm (740 ft/lbs)**



← **36mm (SW36) M24 Spring Eye Bolt - Torque Setting 650 Nm (480 ft/lbs)**

## Notes

All thread and nut / washer interfaces (where applicable) need to be lubricated with anti-seize paste prior to assembly. The spring eye bolt and shock absorber bolts must only be tightened when the suspension is set at the correct ride height.

U-bolt tightening procedure: - nip up all the U-bolt nuts, then fully tighten the nuts to the prescribed torque in several stages on alternate sides (i.e. one U-bolt at a time).