
PACCAR & DEALER
TMC
Technical &
Maintenance
Conference

Ian Thomson
BPW Transpec

BPW Airbag Suspensions

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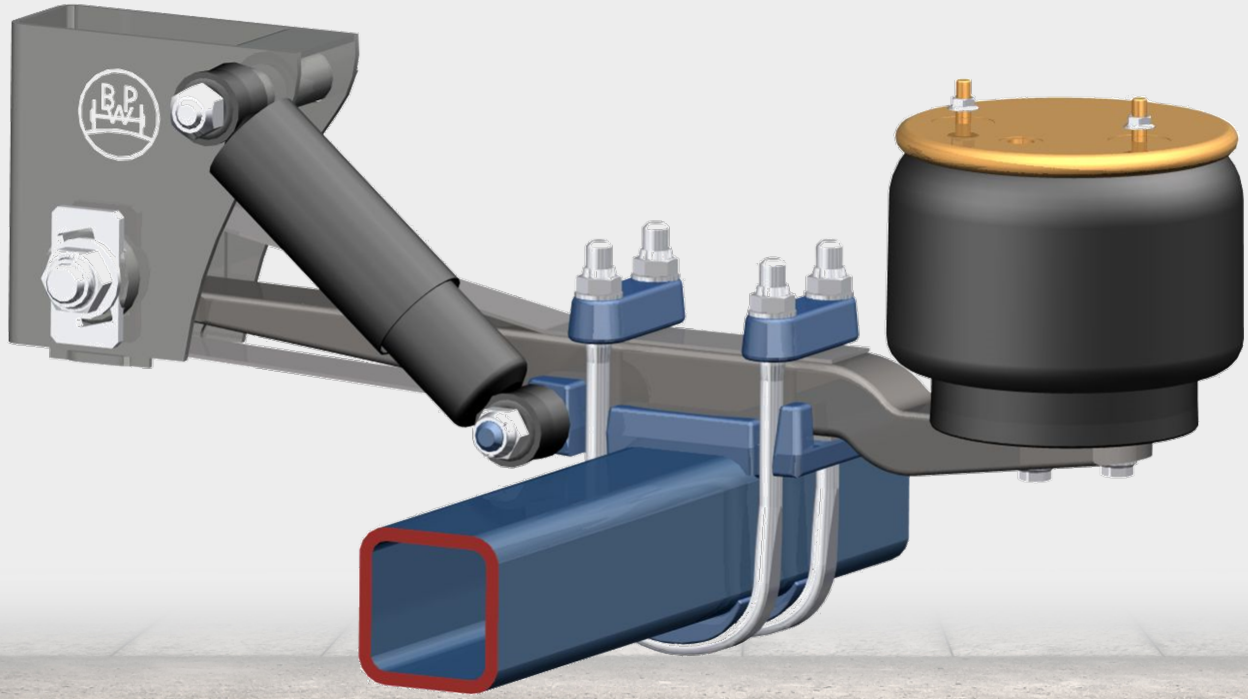

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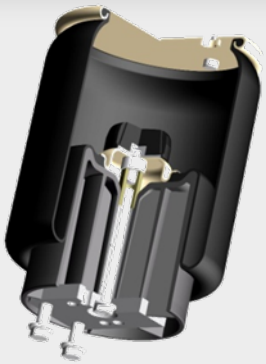
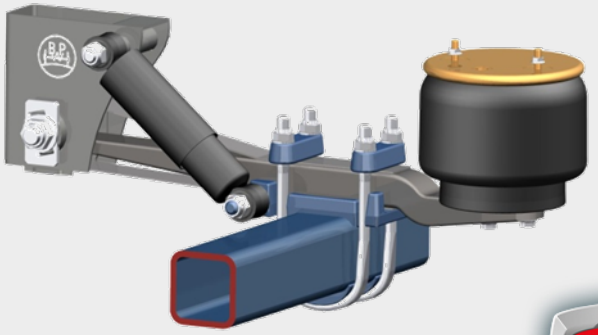
BPW Airbag Suspensions

BPW Airbag Suspensions are of the flexible trailing arm spring type to give:

- Optimal roll stability
- Optimal axle location to minimise tyre wear, and minimise wear and tear on axle componentry
- Maximum serviceability





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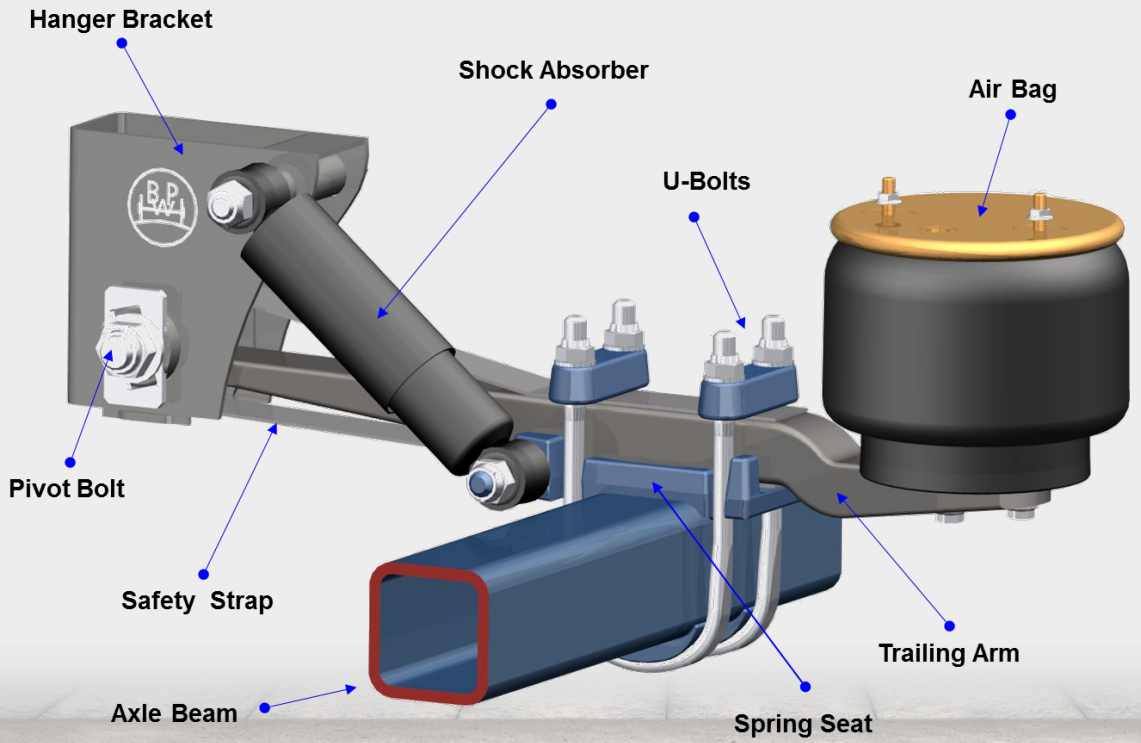
BPW Airbag Suspensions



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BPW Airbag Suspensions

Lubrication and maintenance work Overview

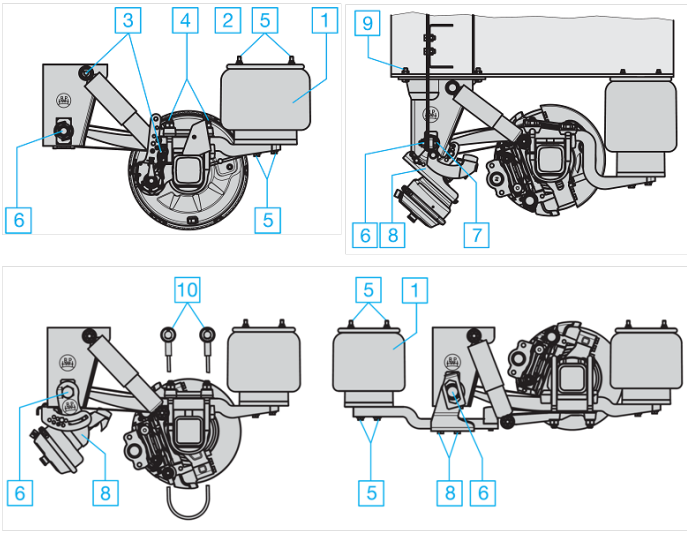
○ Lubricate

□ Maintenance work

T Tighten all bolted connections to the specified torque (1)

For detailed description see pages 44-55

		First service between 1000km and 5000km (1)	Every 12 weeks (Quarterly)	Every 26 weeks (Twice Annually)	Every Year (Annually)(3)
○	Grease stabiliser bearing bushes with grease and check for wear (if stabiliser bars fitted). (4)	○	○		
1	Check condition of air bags.			□	
2	Check air suspension piping for leaks and wear. Check levelling valve and linkage for condition. Check suspension ride height. (2)	□		□	
3	Check shock absorber fastenings. M24 **M = 425 Nm (315 ft/lbs)** M24 (Alloy Hanger) **M = 325 Nm (240 ft/lbs)**	T			□
4	Check U-bolts for firm seating. M24 **M = 650 Nm (480 ft/lbs)**	T			□
5	Check air bag fasteners for firm seating. M12 (upper mounting nuts) **M = 66 Nm (49 ft/lbs)** M16 (lower mounting screws) **M = 230 Nm (170 ft/lbs)**	T			□
6	Check spring eye bolts for firm seating. M24 (SW 36) **M = 650 Nm (480 ft/lbs)** M30 (SW 46) **M = 1000 Nm (740 ft/lbs)**	T			□
7	Check spring eye bolt to gusset plate connection (if fitted). (5) M18 **M = 420 Nm (310 ft/lbs)**	T			□
8	Check axle lift device for firm seating (if axle lift fitted). M16 (cylinder) **M = 195 Nm (145 ft/lbs)** M16 (support arm) **M = 230 Nm (170 ft/lbs)**	T			□
9	Check hanger mounting bolts on frame (if fitted). (5) M16 **M = 260 Nm (195 ft/lbs)**	T			□
10	Catch Strap - check condition and fastening.			□	
–	Check stabiliser fasteners (if stabiliser bars fitted).				□
–	Visually check all components for damage and wear.		□		
–	Drain air suspension tank		□		

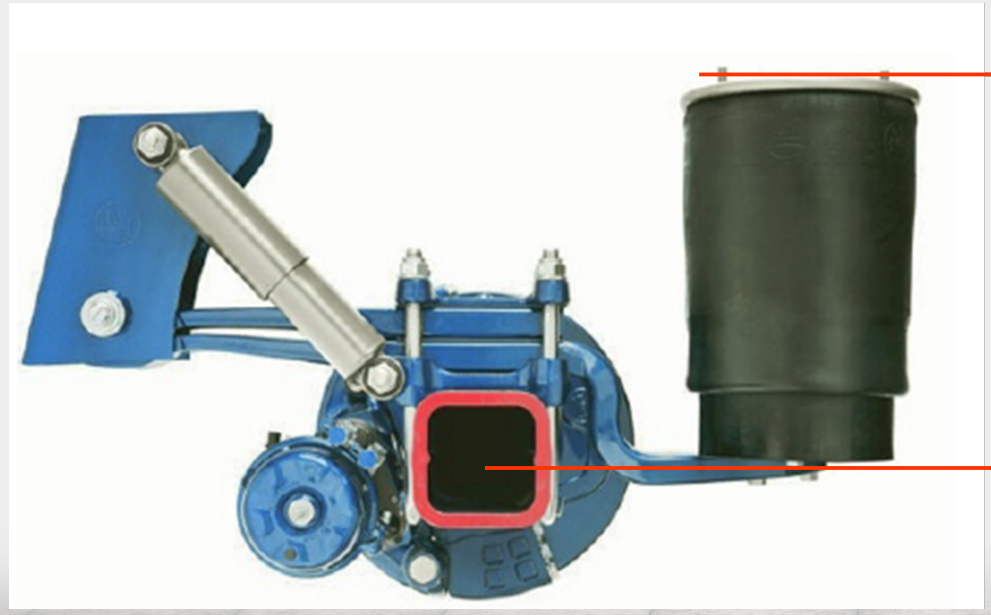


(1) The suspension fasteners must be re-torqued between the first 1,000km and 5,000km. For units operating under extreme conditions the suspension fasteners will bed in earlier and should be re-torqued after the first laden trip.
(2) For correct suspension ride height refer to the appropriate suspension specification.
(3) Under extreme conditions, service more frequently.
(4) Lubricate with BPW special longlife grease ECO-Li Plus
(5) Only with optional BPW bolt-on hanger and gussets.

<u>If re-assembling the suspension please note: -</u>

- All threads and nut washer interfaces (where applicable) must be lubricated with anti-seize prior to assembly.
- The spring eye bolt and shock absorber fasteners are to be tightened when the suspension is set at the correct ride height.
- U-bolt tightening procedure: nip up all the U-bolt nuts, then tighten the nuts to the prescribed torque in several stages on alternate sides (i.e. one U-bolt at a time).

Ride Height



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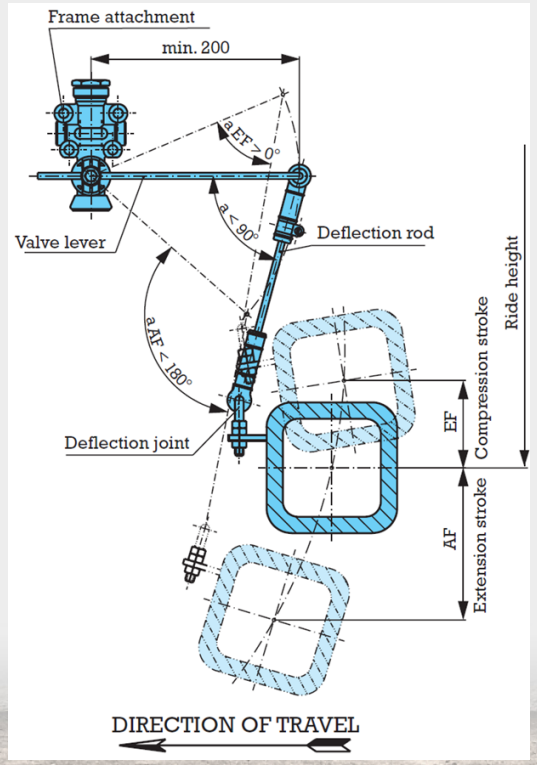
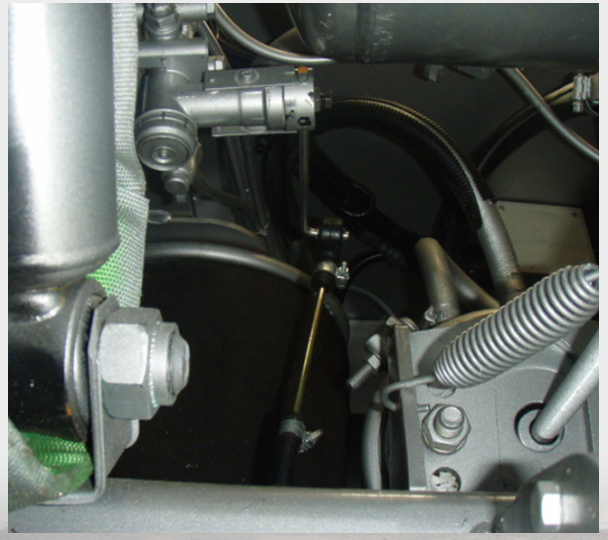
Levelling/Ride Height Value



Examples of poor ride height valve installation

Poor alignment of rods



Rods too short and have inverted

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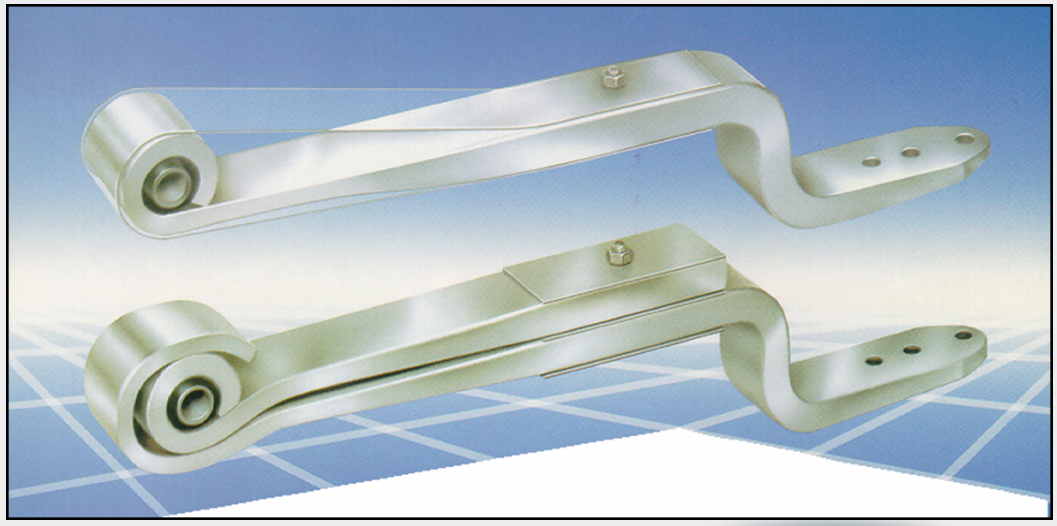
Trailing Arm Springs

- Connecting element between vehicle and axle
- Absorbs all vertical vibrations
- Absorbs all braking torque forces



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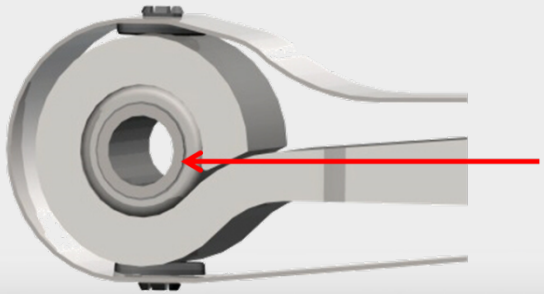
Trailing Arm Springs

- The SRS bush is responsible for horizontal, vertical, longitudinal and torsional guidance of the trailing arms
- Higher life expectancy than just rubber bushes
- Re tension Eye bolt with suspension set at ride height



SRS BUSH = **S**teel **R**ubber **S**teel Bush

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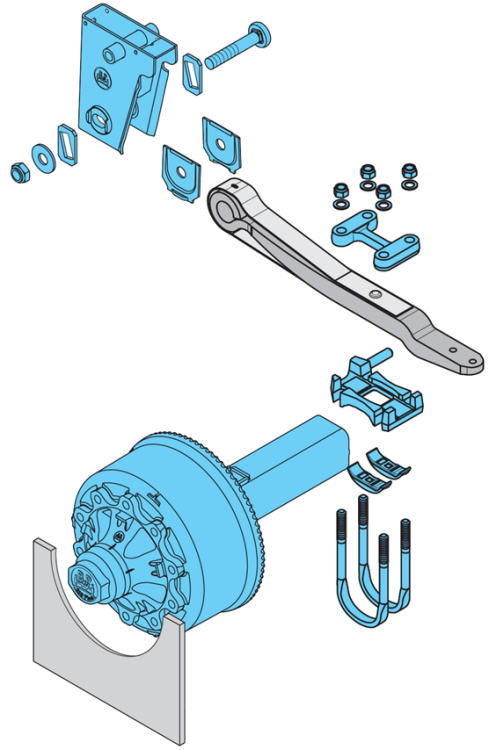
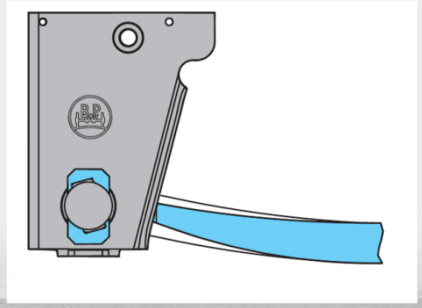
Air Suspension Wear



There should be no visible signs of movement or shiny spots around or near any of these components
Bush movement more than 3mm needs attention



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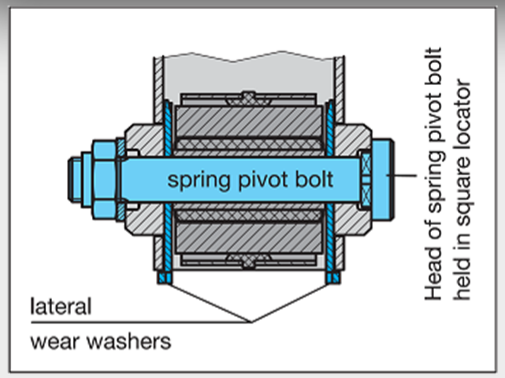
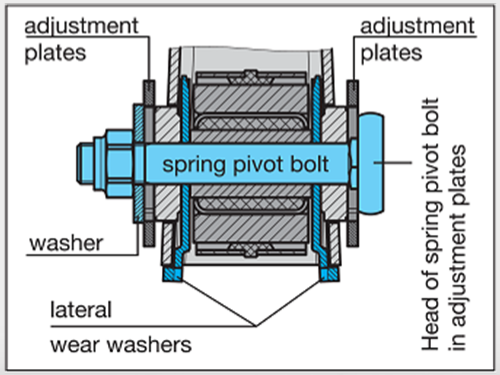
Spring Eye Bush



Fixed Arrangement



Alignable Arrangement

The serviceable life of the Steel Rubber Steel (SRS) bush is dependant on the tightness of the inner steel bushing.

Replacement bushes must be pressed in with support to the outer bush sleeve. If you press the centre you could just shear the rubber.

When a bush is replaced the wear washers need to be renewed as well.

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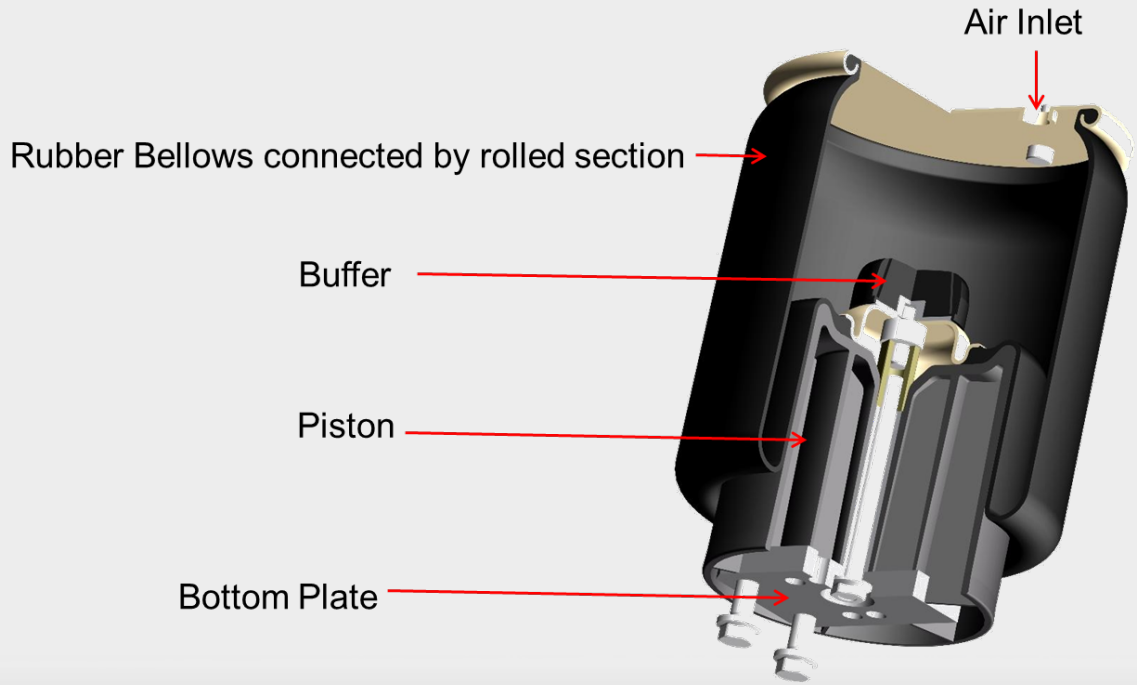
Airbags



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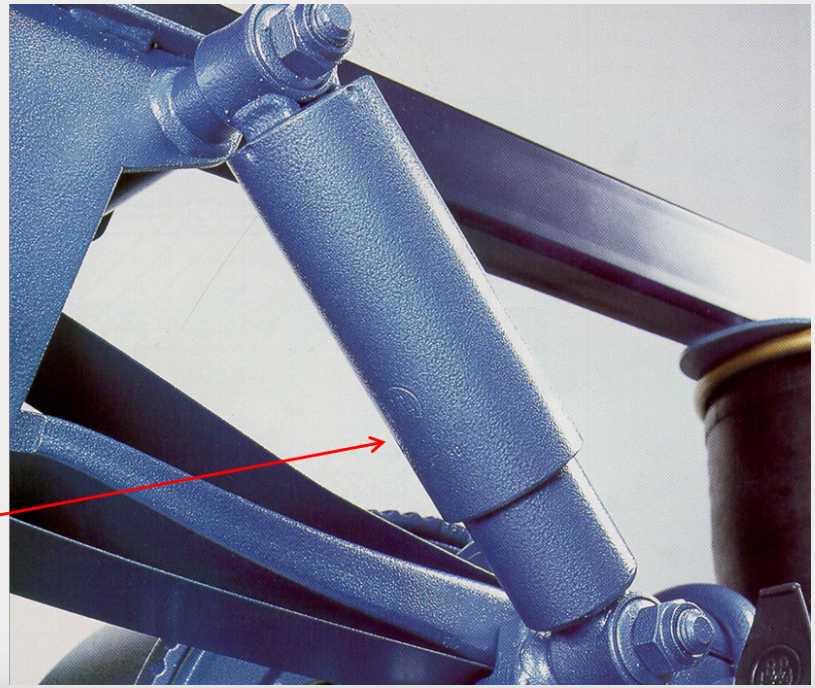
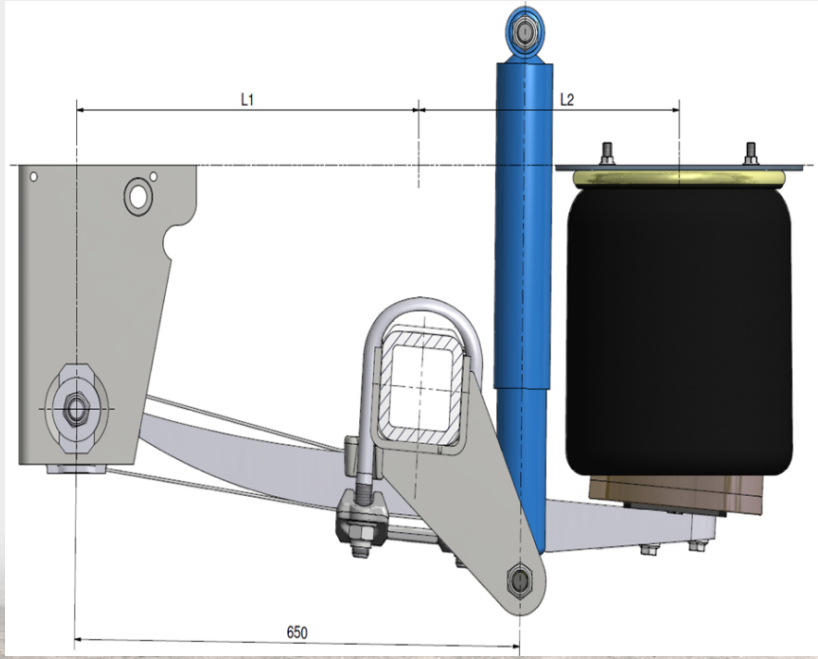
Shock Absorbers



Suspension Geometry

BPW rear mount shock absorber position



SHOCKER LENGTH

SUSPENSION FULL UP	- 509mm
SUSPENSION AT R/H	- 601mm
SUSPENSION FULL DOWN	- 734mm
TOTAL SHOCKER STROKE	- 225mm

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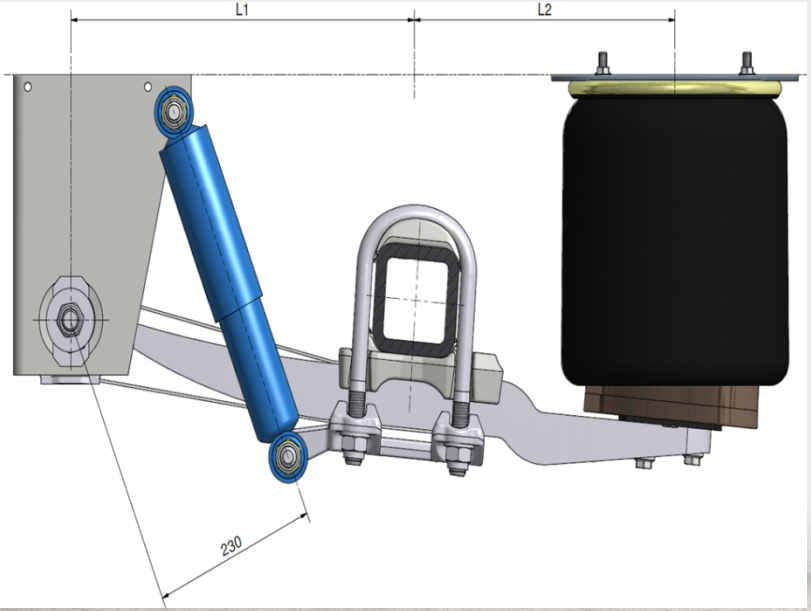
Suspension Geometry

BPW front mount shock absorber position



SHOCKER LENGTH

SUSPENSION FULL UP	- 379mm
SUSPENSION AT R/H	- 412mm
SUSPENSION FULL DOWN	- 464mm
TOTAL SHOCKER STROKE	- 85mm

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Shock Absorber with catch strap

- Strap around shocker prevents over extension of shock absorber and air bag.

Shock sweats = OK

Shock drips = not OK

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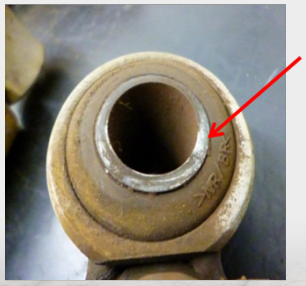
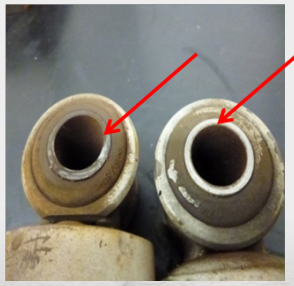
Shock Absorber

Indications of damage from loose shocker mounts:



- Clear indications of loose shocker bolts shows signs of wear.

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Shock Absorber Bush Damage

New shocker –
top bush

Old shocker –
top bush

Shock Absorber Assessment

The following notes are intended to help make an assessment of the shock absorbers function:

1) A thin film of oil on the outside tube of the shock absorber is not necessarily an indication of reduced damping efficiency of the shocker. With new shock absorbers, there is occasionally residual oil in the area under the protective tube that originates during assembly, but this is not a cause for concern. The oil film required on the cylinder pushrod could evaporate and condense on the colder outside tube (the shock absorber sweats).

2) The outside tube of the shock absorber has a film of oil and looks damp.
More than 80% of the outside tube surface is covered with clearly visible traces of oil.
Disconnect the bottom mount and push /pull by hand. There should be no free play when doing the push – pull test
If only a small amount of force is needed to move the shocker – replaced the shock.

3) The shock absorber eyes are clearly deformed, i.e., oval – replaced the shock.

4) The rubber bushes of the shocker are badly worn and deformed then the shocker bushes must be replaced.

5) The steel tubes in the shocker bushes are deformed, worn or split – replaced the shock.

6) Any mechanical damage inside the shock absorber can be determined by a manual check.

7) No mechanical noises (rattling or similar of loose bits) should be heard.

8) If a shocker problem is suspected check shocker temperature with a heat gun immediately after standstill.

A reliable assessment of a shock absorber operational condition can only be achieved by a full system performance test on an appropriate testing device.

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U Bolts and axle clamping

- Visual check: there should be no visible signs of movement or looseness.
- Annually recheck tension under normal road conditions

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Check with manufacturer for correct settings

BPW AIR BAG SUSPENSION TIGHTENING TORQUES

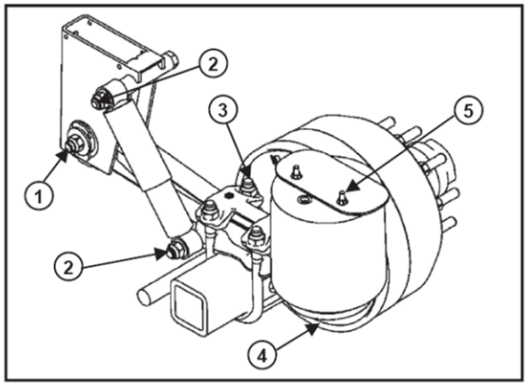
(1) Spring Eye Bolt Nuts
M 24 **M= 650 Nm** (480 ft/lbs)
M 30 **M= 1000 Nm** (740 ft/lbs)

(2) Shock Absorber Fastening
For Steel Hangers and for the lower mount
M 24 **M= 400 - 450 Nm** (295-335 ft/lbs)
For Aluminium Hangers
M 24 **M= 300 - 350 Nm** (225-260 ft/lbs)

(3) U-Bolt Nuts
M 24 **M= 650 Nm** (480 ft/lbs)

(4) Airbag Lower Screws
M 16 **M= 230 Nm** (170 ft/lbs)

(5) Airbag Upper Mounting Nuts
M 12 **M= 66 Nm** (49 ft/lbs)



Note A – All threads and nut washer interfaces (where applicable) must be lubricated with an anti-seize lubricant prior to assembly.

Note B – The Spring Eye Bolt and Shock Absorber fasteners are to be tightened when the suspension is set at the correct ride height.

Note C – BPW Airbag Suspensions are fitted with either an M24 or M30 Spring Eye Bolt. Take care to identify, as they have different torque setting requirements.

M 24 36mm M 30 46mm

Note D – 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).

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8/08

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