



Technical Manual

WARRANTY-SERVICE-  
MAINTENANCE



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## 1. Introduction:

Thank you very much for purchasing a Distag QCS axle, this manual aims to ensure the safety of operators, through the maintenance and service of the axle through its lifetime.

### **Please Note:**

- This manual does not replace the manual provided by the vehicle manufacturer.
- This manual describes everyday maintenance and service operations and does not cover major repairs.
- Maintenance and service should be carried out by a suitably qualified personal using the appropriate tools and equipment.
- **The authors and publisher are not liable for any physical damage or personal injury resulting from errors or omissions in this manual.**

**Carrying out repairs and maintenance work may be dangerous. This safety notice describes only some of the potential hazards and is intended to make users aware of the risks and encourage them to take care.**

### **Unstable vehicles:**

- Always ensure the vehicle is stable and secure by using appropriate forces to stop movement during service and maintenance.
- Never work underneath or near a vehicle that has been raised using only a jack. When working underneath a vehicle that has been jacked up, ensure that the jack is used in conjunction with stands or other effective supports and that the jack and stands used can bear the weight of the vehicle. Also ensure that the ground is firm underneath the vehicle during maintenance and service.

### **Risk of Burn**

- Beware of parts which may be hot after operation, such as brake drums should be left to cool before attending to service these.

### **Personal Protection:**

- Ensure appropriate PPE is worn and equipment is in good working condition, always work in the presence of others.

## 1.1 Warranty

### 1.1.1 Conditions of Warranty

1.1.1.1 The warranty commitment below is only available from Distag QCS, strictly subject to the following conditions:

- The warranty period will commence 4 weeks from invoice date, or
- The warranty period commences once the machine in question has been duly registered with Distag QCS, within 4 weeks of first registration or entry into service. The registration document should include the serial number of the axle being used, and this serial number should be quoted on all correspondence.

1.1.1.2 It is advisable and highly recommended, for users to read through the “Maintenance Instruction” before using any Distag QCS Axle. Failure to carry out required routine maintenance could invalidate the warranty.

## 1.1.2 Scope of Warranty

1.1.2.1 For the duration of the warranty period, Distag QCS will cover the costs for replacement parts, as well as labour costs for disassembly and installation in line with Distag QCS standard time guideline. Such work must be agreed in advance with Distag QCS or the relevant machine manufacturer, and performed by suitably qualified person.

1.1.2.2 Defective or damaged parts, that have been disassembled, must be kept in storage, and made available for either:

- Detailed photograph's to be taken to support the claim, or
- Recall of the concerned parts to Distag QCS premises, or to the factory.

1.1.2.3 Duration of the warranty for the parts:

- Axle Beam: Subject to normal usage, and appropriate loading, the axle beam will have a 2 year warranty.
- Components: Subject to normal usage, the warranty period will be 1 year

## 1.1.3 Exclusion from Warranty

1.1.3.1 Normal wear and tear e.g. brake linings.

1.1.3.2 Damage caused by foreign objects entering the brake drum area of the axles.

1.1.3.3 Damage caused by use of the machine in abnormal conditions, or in an inappropriate application, or by operator misuse.

1.1.3.4 Failure attributed to the basic maintenance tasks as listed in this document not being followed e.g. lack of lubrication, or regular checking and re torqueing of U-Bolts.

1.1.3.5 Any failure attributed to the original machine design, or where the axles is not fitted in accordance with the correct criteria for normal use, or where the axle used has not been specified for the machine application.

1.1.3.6 Any consequential losses, beyond the replacement of the defective items, unless agreed in writing with Distag QCS.

## 1.1.4 Repairs During the Warranty Period

1.1.4.1 If repairs are carried out during the warranty period, the guarantee covering the replaced component will continue as the original component; and not start afresh.

1.1.4.2 It is essential that all maintenance work is carried out in accordance with the prescribed intervals, in order to maintain the safe operation, and roadworthiness of the machine. The relevant operation and service guidelines of the machine manufacturer must also be adhered to.

1.1.4.3 We strongly recommend that only Genuine HO'S Unite parts are used when fitting spare parts.

## 2. Axles

### 2.1 Maintenance

#### 2.1.1 Check Wheel Nuts for Tightness

The tightening torque of the wheel nuts must be checked after,

1. The first use.
  2. The first high load journey after the wheels have been fitted.
  3. The first 1000 km.
  4. Every 1 month or 10,000 Km
- Tighten wheel nuts diagonally using a torque wrench to the specified tightening torque shown in Table 1 & Table 2 below.
  - Note that wheel contact surfaces should not have additional coats of paint as this increases the risk of the wheels becoming detached.
  - The torque values shown below can be achieved using a normal wheel nut spanner and a length of tubing as shown in the image below.
  - Distag QCS recommend the use of wheel nut indicators to insure wheel security.

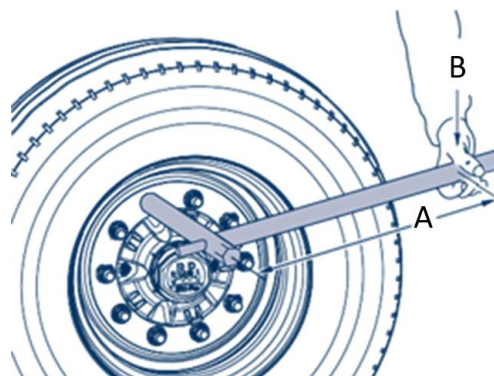


Figure 1 Calculated Tightening Torque

Table 1 Tightening Torque Value for Wheel Nut and Conical Washer

Stud Alignment	Tightening Torque	Tubing Length "A"	Physical Weight "B"
M20x1.5	380 Nm (360 - 400 Nm)	600mm	60-67Kg
M22x1.5	510 Nm (485 - 535 Nm)	800mm	60-67Kg

Wheel Nut & Conical Washer

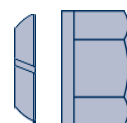


Table 2 Tightening Torque for Wheel Nut with Collar

Spigot Alignment	Tightening Torque	Tubing Length "A"	Physical Weight "B"
M20x1.5	480 Nm (455 - 505 Nm)	800mm	57-63Kg
M22x1.5	630 Nm (600 - 660 Nm)	1000mm	60-67Kg

Wheel Nut with Collar



## 2.1.2 Checking the Manual Slack Adjuster Operation

**Please Note:** Frequent checks of the manual slack adjuster are necessary, depending upon application every 1 to 3 weeks. Follow the procedure described below to check the slack adjusters.

- Actuate slack adjusters by hand, pulling against the return spring. If there is more than 35 mm of play, the slack adjuster must be reset. This can be done by adjusting the nut on the slack adjuster as shown.
- Adjust the play, shown as "a" in the diagram below, to 10 -12% of the connected brake lever length "B", e.g. lever length 150 mm = 15 - 18 mm of play.
- Please Note: Automatic slack adjusters make this adjustment automatically whenever the camshaft is rotated by more than 17.5°.

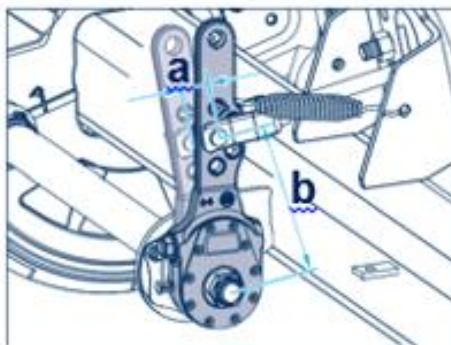


Figure 2 Manual Slack Adjuster

## 2.1.3 Checking Brake Lining Thickness

The checking of the brake lining thickness should be conducted every 3 months.

Open inspection hole by folding back the rubber flap. The brake lining should be replaced at a residual lining thickness of 5 mm (check with slide gauge) or on reaching the bottom of the indicator machined into the edge of the lining. Re-insert the rubber flap.

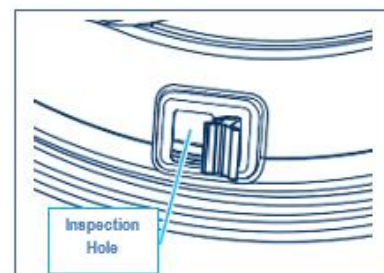


Figure 3 Inspection Hole

## 2.1.4 Check Wheel Hub Bearings

In order to check the wheel hub bearing play,

1. Lift the axle until the wheels are off the ground.
2. Release the brake.
3. Apply a lever between the tyre and the ground and check the play.

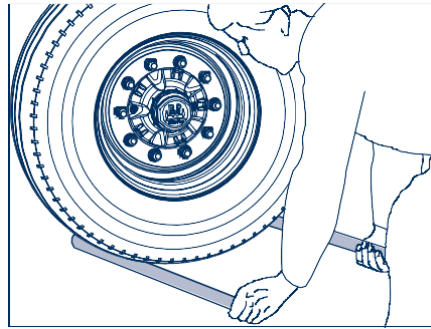


Figure 4 Checking Wheel Hub Bearings

If bearing play is detected, the bearing must be adjusted.

To adjust the wheel hub bearing:

1. Unscrew the cap.
2. Remove the split pin from the axle nut.
3. Fasten the axle nut using a torque wrench and with the continuous turning of the wheel hub. It should take several turns until the tightening torque has reached the desired value.

Tightening torques:

6 to 14 tons axle load = 150 Nm +8/-23 Nm.

-If a normal axle nut spanner is used, tighten the axle nut until the wheel bearing race drags slightly.

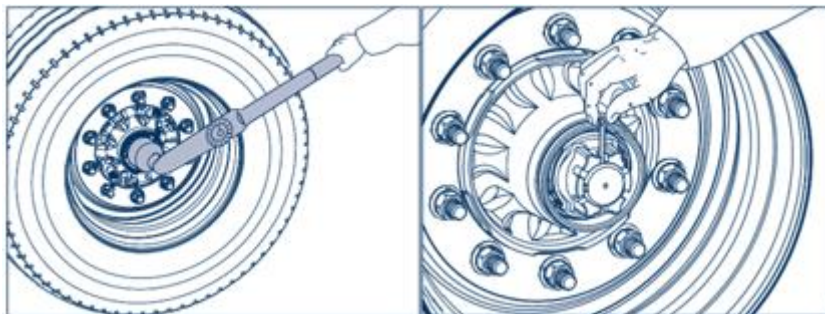


Figure 5 Tightening of the Axle Nut

Turn back the axle nut to the next available split pin hole. Should they already be in line turn back to the next hole (30° at the maximum).

Insert the split pin and bend upwards slightly.

Refill the cap as required with Ho's Unite special long-life grease.



Tighten the hub cap. Internal thread hub cap – 450Nm, External thread hub cap 400Nm

## 2.1.5 Check Hub Caps Tightness

This should be completed every 6 months

Check caps for tightness using a torque wrench or power tool.

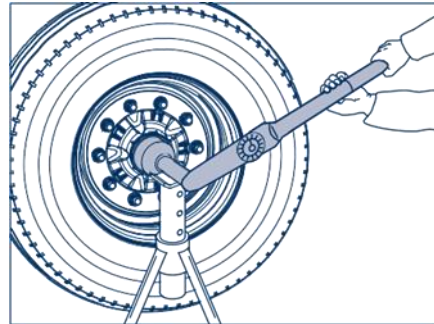


Figure 6 Checking Hub Cap Tightness

In an emergency the caps can be tightened using a normal cap spanner, by striking the latter with a hammer, or also with the aid of a piece of tubing placed over the wheel nut.

Tighten to the correct tightening torque as soon as possible.

## 2.1.6 Visual Inspection

– Every 3 months –

Check the tyre condition

– Every 6 months –

Check all components for damage and wear.

## 2.2 Lubrication

Note: After cleaning the vehicle with high-pressure cleaners, all lubrication points must be re-lubricated.

Ho's Unite Trailer axles / Ho's Unite Steering axles

Table 3 Axle Lubrication Schedule

#	Type	Every 2 Months	Every 3 Months	Every 6 Months	Every 12 Months	Every 24 Months	With each brake lining change
2.1.1	Steering Pivot (Top & Bottom)	✓					
2.1.2	Low maintenance brake camshaft bearing (Inner & Outer)		*	✓			✓
2.1.3	Slack Adjuster		✓				✓
2.1.4	Wheel Hub Bearing				*	✓	✓
*	Off-Road use						



## 2.2.1 Steering Pivot (Top & Bottom)

\* Every 2 months\*

Lift axle in order to relieve the steering pivot bearing. Grease lubrication nipple with Ho's Unite special long-life grease until fresh grease emerges from the bearing points.

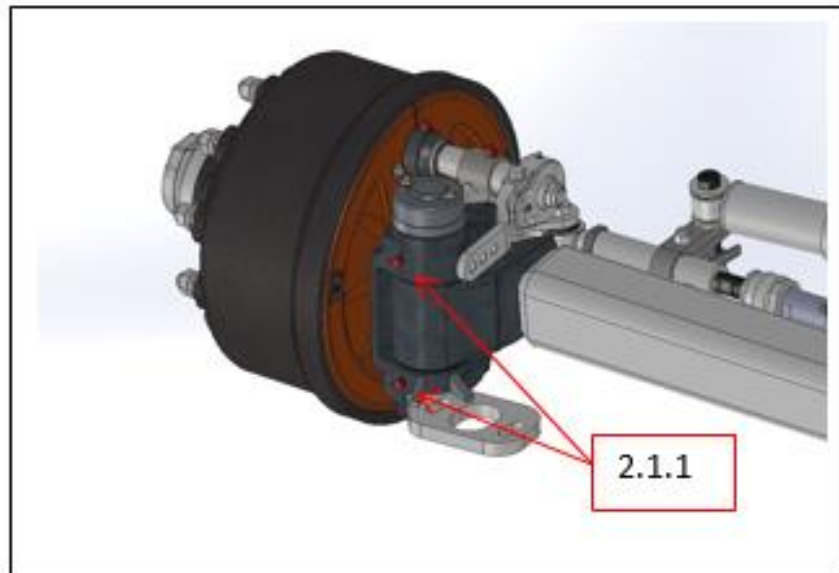


Figure 7 Showing Steering Pivot Grease Points

## 2.2.2 Brake Camshaft Bearing (Inner & Outer)

- Every 6 months – On-Road use
- Every 3 months – Off-Road use
- With each brake lining change -

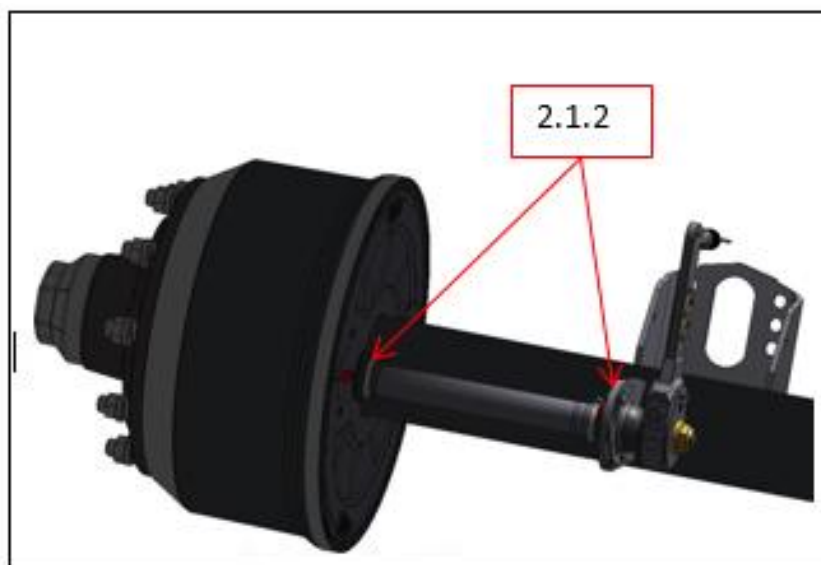


Figure 8 Showing Camshaft Grease Points

Prevent the vehicle from rolling away. Release the service brakes and the handbrake.

Lubricate the brake camshaft bearing through the grease nipple with Ho's Unite special long-life grease until fresh grease emerges from the bearing points.

### 2.2.3 Manual Slack Adjuster

\* Every 3 months \*

Grease lubrication nipple with Ho's Unite special long-life grease until fresh grease emerges.



Figure 9 Showing Grease Point on Slack Adjuster

### Automatic Slack Adjuster

- Every 12 months – On-Road use
- Every 6 months – Off-Road use
- With each brake lining change –

Grease with Ho's Unite special long-life grease (approx. 80 g) until sufficient new grease emerges from the adjustment bolt.

Turn back adjustment screw (keep clutch sleeve pressed down) by approx. one turn using a ring spanner. Actuate the brake lever several times by hand. The adjustment must be carried out smoothly. If necessary, repeat several times.

Adjust the brake

### 2.2.4 Wheel Hub Bearing

- Every 24 months or up to 150,000 Km's – On-Road use
- Every 12 months or up to 75,000 Km's – Off-Road use
- With each brake lining change –

Remove the wheel hub and bearing, thoroughly clean the taper roller bearing and seals, dry and check if they can be re-used. Work Ho's Unite special long-life grease into the cavities between the taper rollers and cage in both taper bearing. (For grease quantity, see table below). Fit the wheel hub, tighten the axle nut whilst at the same time turning the wheel hub.

*Table 4 Lubrication Instructions for Wheel Hubs*

<b>Lubrication Quantity Per Each Wheel Hub.</b>			
<b>Axle Size</b>	<b>Capacity</b>	<b>Inner Bearing</b>	<b>Outer Bearing</b>
Ø310*190	11,000Kg	180g	320g
Ø406*120	11,000Kg	180g	320g
Ø420*180	12,000Kg	180g	320g
Ø420*180	14,000Kg	240g	500g
Ø420*200	16,000Kg	400g	800g
Ø420*220	16,000Kg	400g	800g

## 3. Steering Axles

### 3.1 Introduction

For the general procedure on the service and maintenance of steering axles, please refer to sections 2.2 (Maintenance) and 2.3 (Lubrication) above as all the guidelines given also apply to steering axles.

Self-steering axles incorporate 1 locking cylinder and either 1 or 2 shock absorbers. The shock absorbers purpose is to stabilise the mechanism and reduce sudden movements of the wheels. The locking cylinder is used to lock the steering axle when reversing, and can also be used when driving forwards on roads at higher speeds, or on hilly terrain.

### 3.2 Maintenance

#### 3.2.1 General Maintenance for Steering Axles

- Lubricate the various components as outlined in section 2.3 above.
- Visual inspection for any leaks of oil from the hydraulic cylinder or shock absorber, also check for any signs of damage to these components.
- Inspect the tightness of all nuts and bolts associated with the steering elements of the axle, the procedure for this is shown in section 3.2.2.
- Visually inspect the connecting rod, ball joint and clevis assembly connected to the axle drum and cylinder for any damage as this will affect the steering angle.
- Check the positioning of the angle limit screws on the axles.

**It is essential before carrying out any work on hydraulic or pneumatic systems, take all necessary actions to ensure that the hydraulic fluid or air is not under pressure.**

#### 3.2.2 Tightening of Bolts and Nuts

Check the tightness of all nuts and bolts located on the steering axle every 6 months and tighten if necessary.

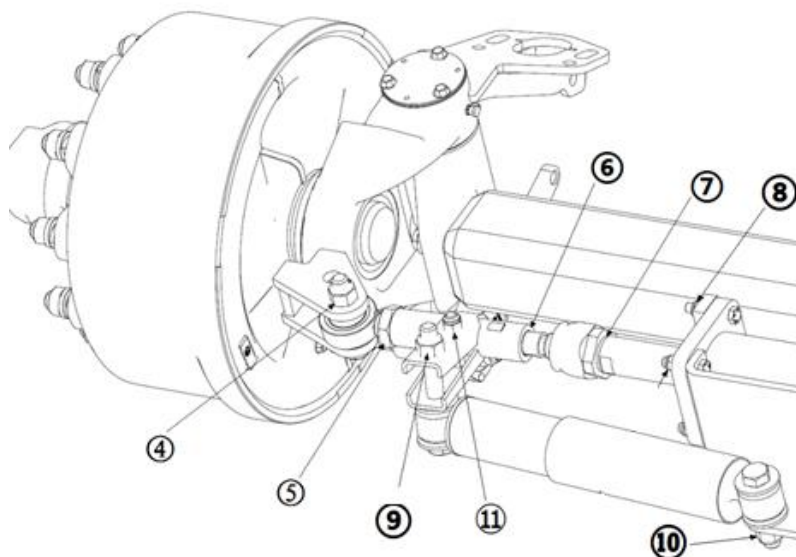


Figure 10 Showing the Tightening Points on Steering Axles

- No.4 above must be tightened in order to secure the connecting rod to the axle drum.
- The tightening torque of the connection rod nut on the ball joint and clevis assembly No.5 is 750 – 850 Nm.
- The tightening torque of the ball joint and the centre piece No.6 is 650 – 700Nm.
- The tighten torque of the cylinder piston and the ball joint end No.7 is 380 – 450Nm.
- The tightening torque for the fixing of the cylinder to the axle nut No.8 is 80-100Nm.
- The tighten torque of the shock absorbers hanger and cylinder connection nut No.9 is 45-55Nm.
- Tighten the shock absorbers fixed nut No.10.
- The tightening torque for the locking nut of the clamp No.11 is 120-140Nm.

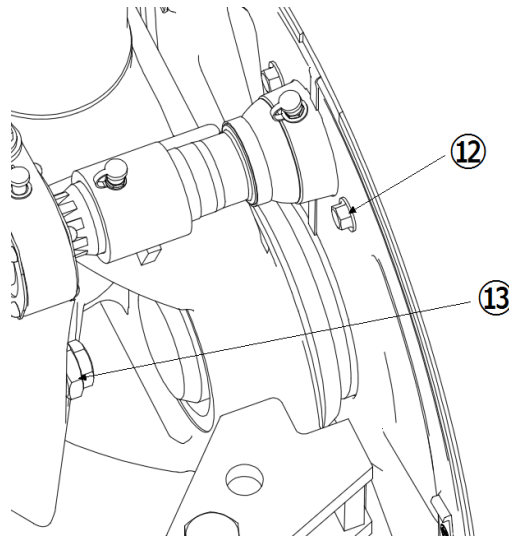


Figure 11

1. The tightening torque of the dust cover screw No. 12 is 45-55 Nm.
2. The tightening torque of the steering limit nut No.13 is 180-220 Nm.

### 3.2.3 Checking the Steering Pin

The steering pin should be checked every 6 months. The procedure for checking the steering pin is as follows,

**Step 1:** Remove bolts as shown below and remove cap.



Figure 12a

**NOTE:** The orientation of the kingpin may vary, depending on the year of manufacture of the axel.

If the kingpin nut is located on the underside of the axel, the following steps (a-c) will need to be taken before proceeding on to **Step 2**.

- a. Raise axel above the ground using hydraulic jack.
- b. Remove opposite cap and rubber seal, as shown in in Figure 1b.
- c. Tap kingpin downwards using hammer to tighten taper fit of kingpin, as seen in Figure 1c.
- d. Approximate end position of Kingpin shown in Figure 1d.



Figure 1b



Figure 1c



Figure 1d

**Step 2:** Loosen lateral bolt using Allen key.



Figure 13

**Step 3:** Replace the steering pin, install the new steering pin in position ( the steering pin must fit in place, the tapered surface of the steering pin and knuckle seat must match to auto lock), if necessary replace the lubrication bearing in advance. Install



the washer and seal ring in turn, and tighten the steering nut with a torque of 120-150Nm, and back loose 30°- 45°.



Figure 14a

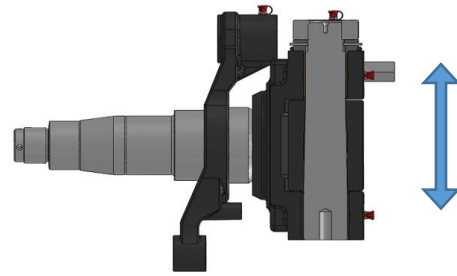


Figure 3b

**Step 4:** Apply Loctite or a different thread lock to lateral bolt and tighten with a torque of 45-55Nm.



Figure 15

1. **Step 5:** Install the knuckle end cap, and the M10 lock nut (3) with a torque of 35-40Nm as described below.



When axle is steering the kingpin and cap should remain in a fixed position to the axel.

Figure 16



### 3.2.4 Checking and Adjusting the Wheel Alignment

If an operator feels that the vehicle wheel alignment may be off, it is important to perform this check as early as possible in order to avoid tyre wear or component damage.

To perform a wheel alignment check,

1. Place the vehicle and the self-steering axle in line on a flat and perfectly horizontal surface.
2. This should be done with the cylinders extended, therefore the axle in the locked position.

Measure the distance between the wheel rims at the front of the self-steering axle, and then at the rear, (A and B) you should find the same measurement within tolerance of + or - 1mm.

Repeat this procedure after turning the wheels half a turn to ensure accurate measurement.

If the measurement continues to be outside of the specified tolerance follow the given procedure below in order to adjust wheel alignment.

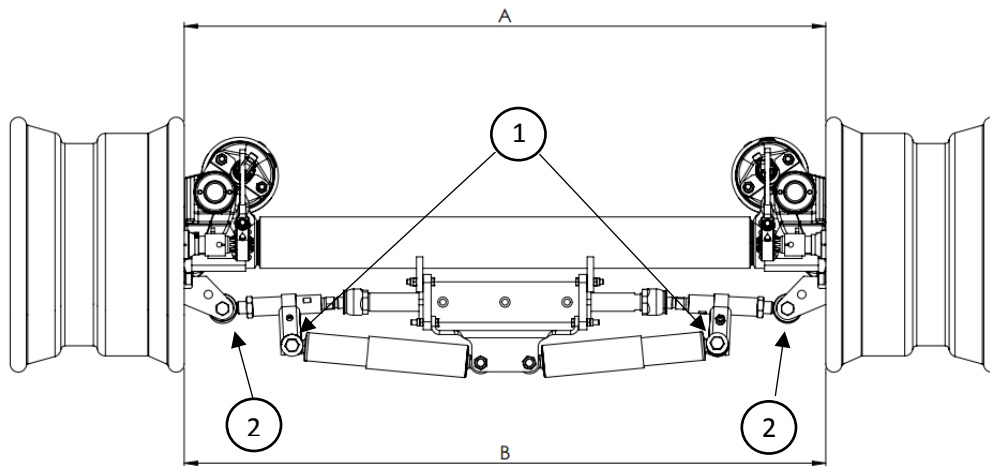


Figure 17 Distance A and B Shown for Wheel Alignment Check

#### Procedure for adjusting wheel alignment:

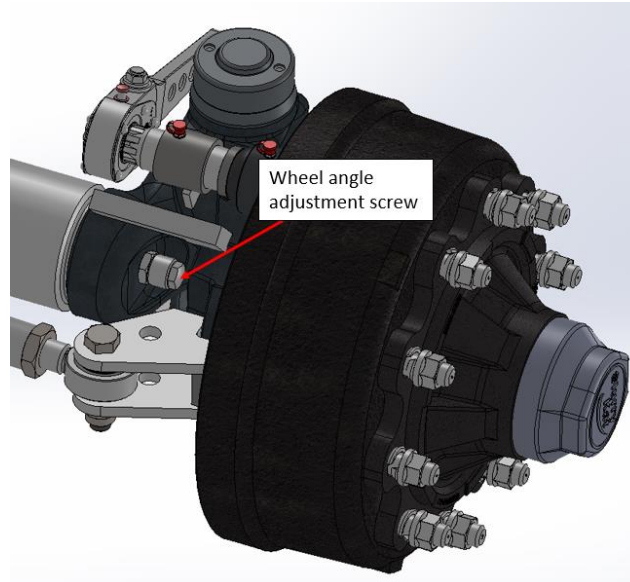
1. Ensuring Cylinder is fully pressurised and in the locked position.
2. Remove the 2 Shock Absorber Pins shown in Figure 17 as item No. 1.
3. Remove the 2 Clevis head Pins shown as No. 2 in Figure 17.
4. Once removed, drive vehicle forwards on a straight line reference for approx. 5- 10 metres.
5. Adjust clevis head by turning until it is in position for the pin to be reinserted.
6. Re-check using procedure given above.
7. Please Note: If problems persist contact main dealer for further examination.

### 3.2.5 Adjusting the Steering Angle Stopper Screws

If necessary it may be required to adjust the steering angle limit by adjusting the stopper screws, these are located as shown in Figure 18.

Check the full-lock angle regularly by turning fully to the right and to the left and checking that the tyres do not touch the trailer chassis or suspension as this might wear or damage the tyres.

If fouling occurs adjust the screws to limit the steering angle.



*Figure 18 Showing the Location of the Wheel Adjustment Screw*

## 4. Bogie Suspensions

### 4.1 General Maintenance and Service instructions

To ensure safe operating, the following must be done after the first laden journey, or every 1 month thereafter.

1. Tighten all the U-bolt nuts, location as seen in Figure 19, to the recommended torque which can be found in Table 5.
2. Tighten the central nut to a torque of 300-400 Nm, this is shown as No.3 in Figure 20
3. If the suspension is bolted to the chassis, tighten these bolts.
4. Grease the two Central pins, shown as No.4 in Figure 21.

Under severe or harsh operating conditions maintenance should occur more regularly.

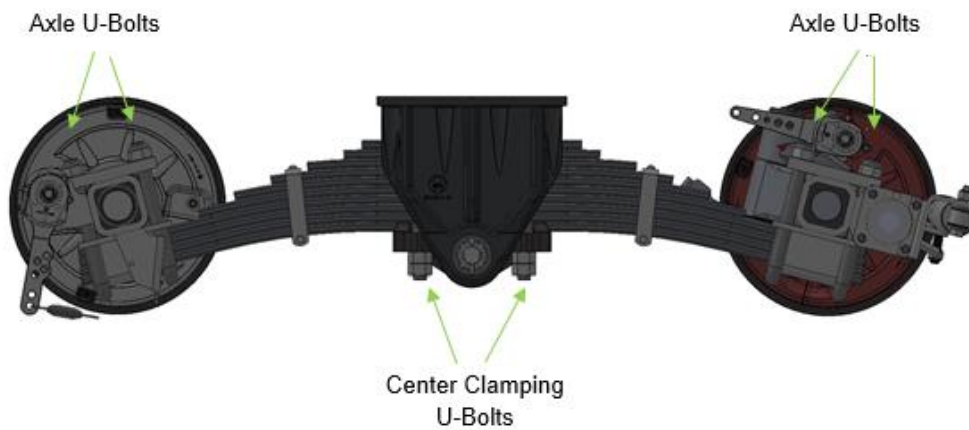
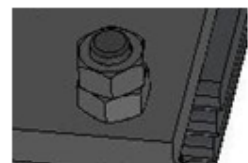


Figure 19 identifies the location of the U-Bolts

Table 5 The required torques for the various U-bolt nuts as shown to the right

Size	Grade	U-Bolt Torque Settings		
		Double Nut Type		Nylon Locknut
		Inner Nut	Outer Nut	
M30	10.9	960 Nm	1200 Nm	1100 Nm
M27	10.9	800 Nm	1000Nm	-
M24	10.9	560 Nm	700 Nm	700 Nm
M22	10.9	440 Nm	550 Nm	550 Nm

Double Nut Type



Nylon Locknut Nut



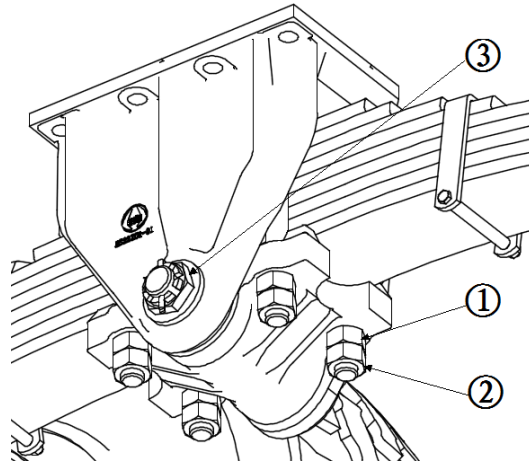


Figure 20 Showing the Position of the U- Bolt nuts, the Central Nut and the grease point.

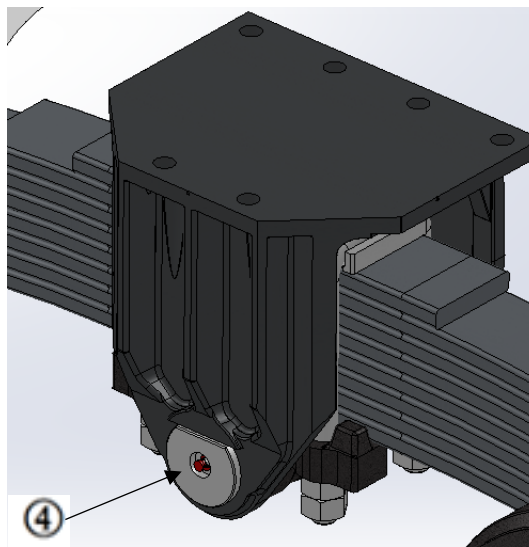


Figure 21 Showing the Central Pin Grease Point

## 5.Suspension

### 5.1 Slipper & Eye Suspension

Suspension service and maintenance on the slipper & eye type suspension should be carried out,

1. After the first laden journey.
2. Every 6 months thereafter.

In order to conduct this service please follow the following procedure whilst referring to Figure 22

1. Lubrication should be applied to the 6 grease points identified in Figure 22.
2. U-Bolts should be tightened to the recommended torque as outlined in Table 5, section 4.1.
3. Ensure tightness of nuts identified as No.9, 10, 11 and 12 in Figure 23.

**Under harsh or intensive operating conditions, maintenance should be carried out more frequently.**

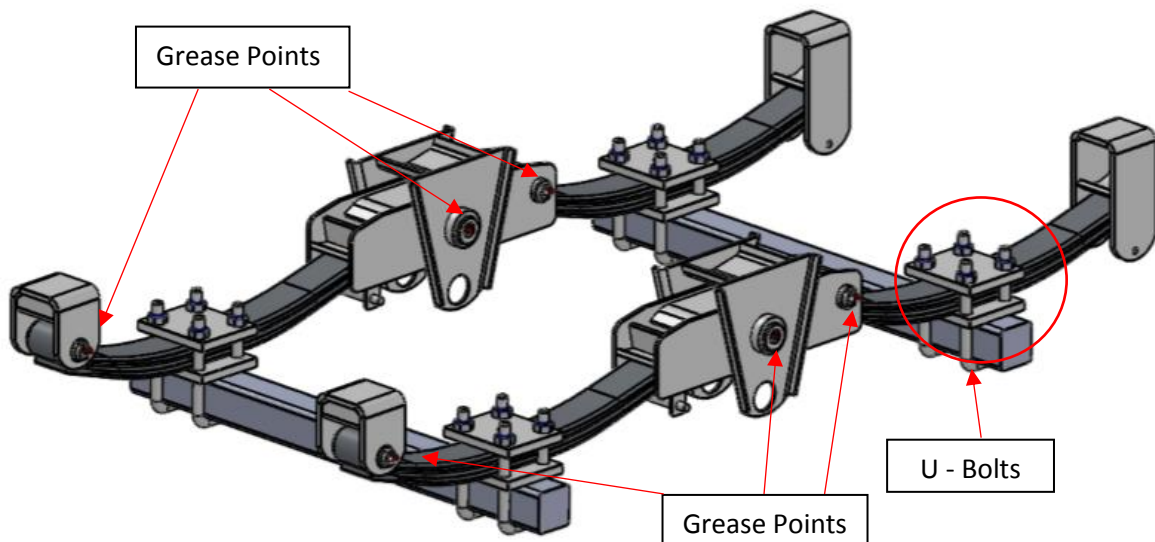


Figure 22 Showing the Service areas on Slipper and Eye Suspension

Yearly maintenance checks of the slipper and eye type suspension is also required. The following procedure should be followed to achieve this, please refer to Figure 23 in conjunction with this procedure.

- Visually inspect the condition of the springs by thoroughly cleaning them to check for any cracks or deformation.
- Check the clearance between the bushings No. 2 and the rocker shaft No. 1, if excessive clearance is seen, replace the worn parts.
- Inspect the spring shackle pin for any deformation or wear No.10 and replace if there is excessive wear or deformation.
- If clearance between the springs and the axles is visible, proceed to check the whole of the clamping system, items No.5, No.6, No.7 and No.8.

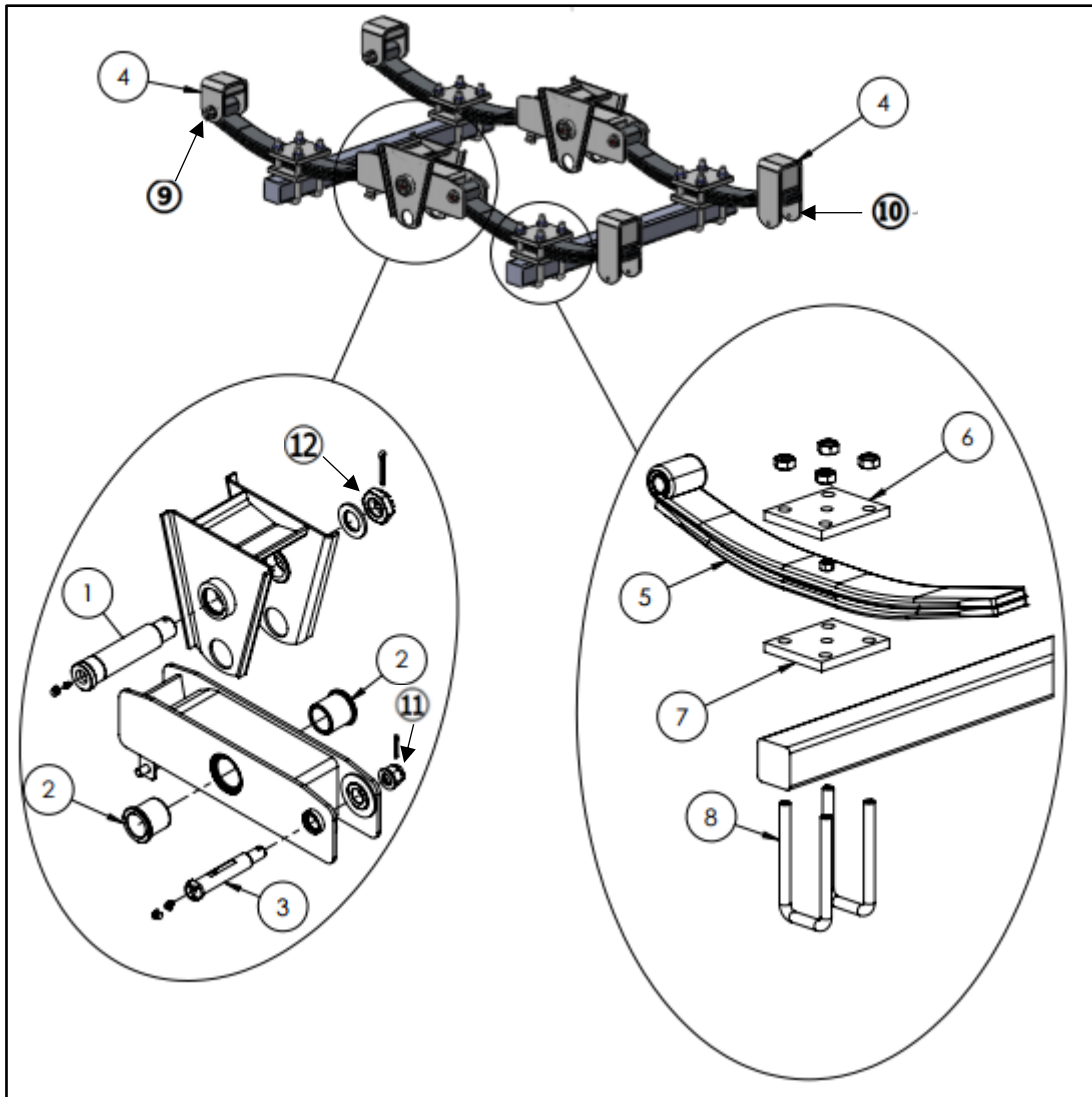


Figure 23 Exploded View of Slipper & Eye Suspension



## 5.2 RSC & YSC Suspension

Suspension service and maintenance on the RSC & YSC suspension should be carried out,

1. After the first laden journey.
2. Every 6 months thereafter.

In order to conduct this service please follow the following procedure whilst referring to Figure 27.

1. U-Bolts should be tightened to the recommended torque as outlined in Table 5, section 4.1.
2. Ensure tightness of the nuts identified in Figure 24 on each side and Figure 25 if applicable.
3. Ensure that the clamping bracket and the suspension bracket do not touch, these can be seen in Figure 26 below. If they do, replace the conical washer which is shown as No.6 in Figure 27.

**Under harsh or intensive operating conditions, maintenance should be carried out more frequently.**

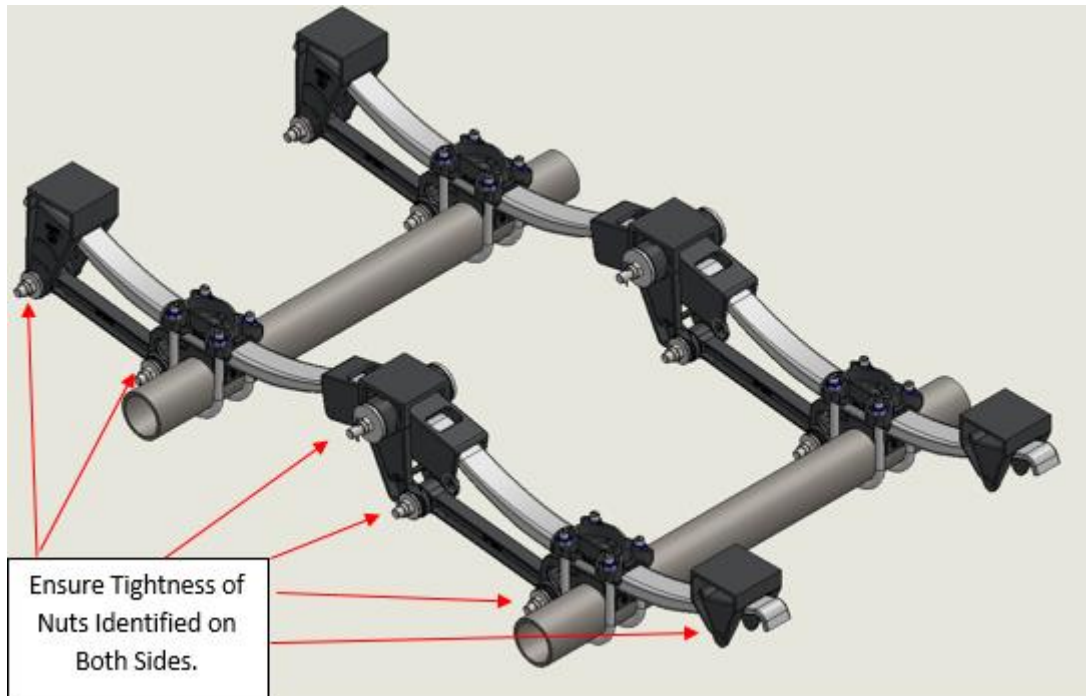


Figure 24 Showing Tightening Points for a RSC and YSC Suspension

Please Note, If a suspension incorporates an adjustable torque arm as shown in Figure 25, ensure tightness of the 4 bolts as identified also whilst servicing.



Figure 25 Adjustable Torque Arm

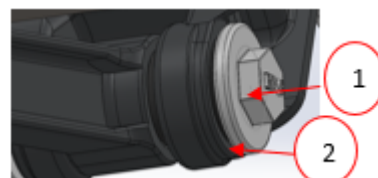


Figure 26 Space Between Washer and Bracket Edge



Yearly maintenance checks of the RSC and YSC suspension is also required. The following procedure should be followed to achieve this, please refer to Figure 27 in conjunction with this procedure.

- Visually inspect the condition of the springs by thoroughly cleaning them to check for any cracks or deformation.
- Check the clearance between the hanger bushings No. 5 and the central equaliser pin No. 4, if excessive clearance is seen, replace the worn parts.
- If clearance between the springs and the axles is visible, proceed to check the whole of the clamping system as shown in the right section view below.

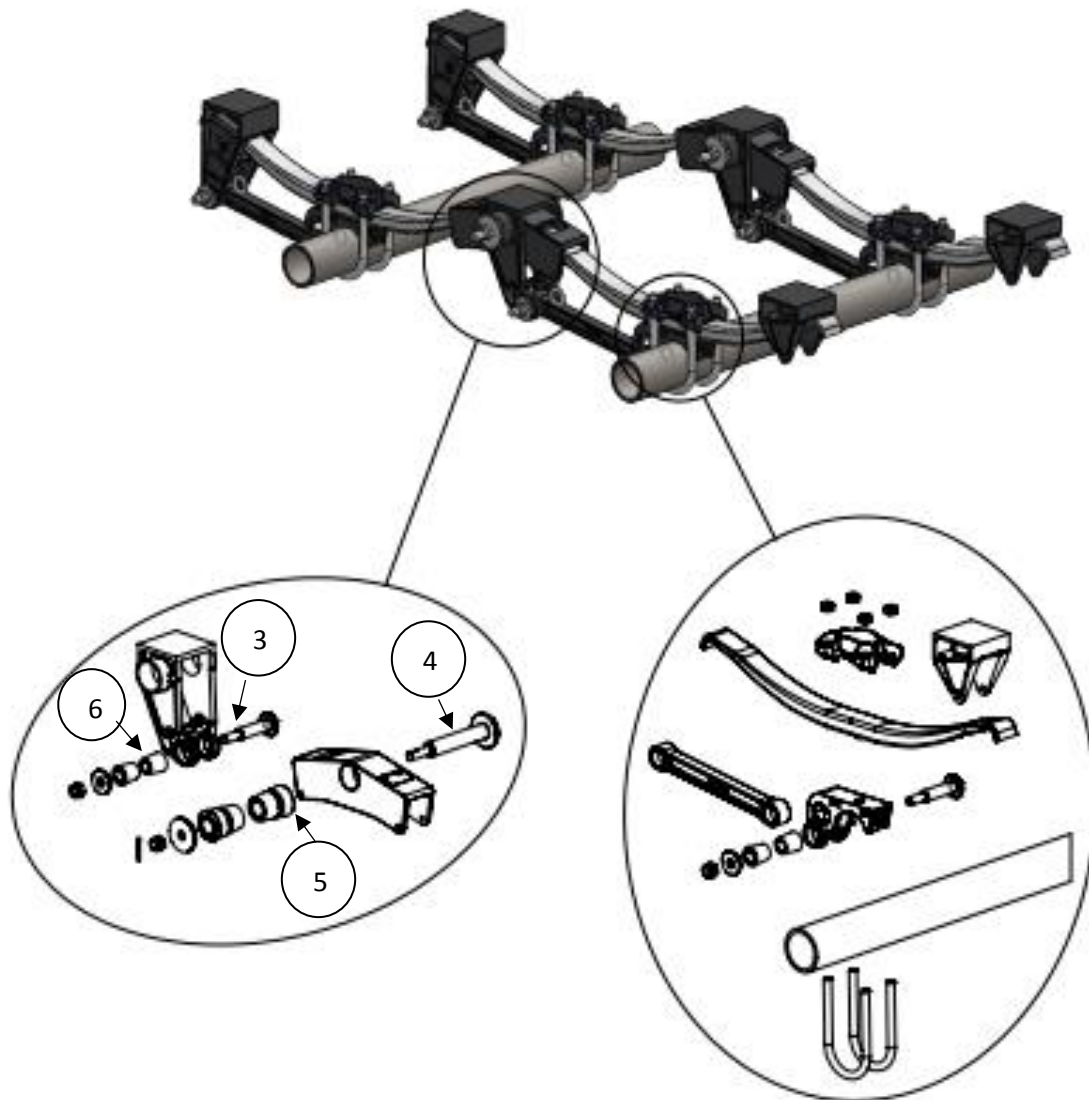


Figure 27 RSC and YSC Suspension Exploded View