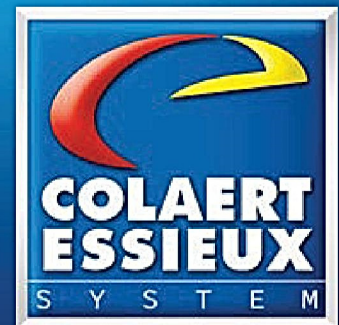




PB-ADR-A

MAINTENANCE MANUAL



9CRC2322208

2) 92322208
3) 92620009

Kit 8 écrous de roue M20x150
et rondelles



9CRC4100067

3) 94100067

Kit 8 axes de roue M18x150 L86
pour essieux freinés



9CRC7170030

1) 97170030

Chapeau de moyeu diam. 80
EF 8068 - EF 8006 - EF 8008 - EF 8168
EF 8168 - EF 9168



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1. Safety notice

The authors and publisher are not liable for any physical damage or personal injury resulting from errors or omissions in this manual.

This manual does not replace the manual provided by the vehicle manufacturer.

Maintenance must be carried out by suitably qualified personnel using appropriate tools.

This manual describes everyday maintenance operations and does not cover major repairs.

We recommend that maintenance should be carried out by a specialised workshop.



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.

Personal protection :

Wear appropriate personal protection equipment : goggles, mask, gloves, helmet, safety shoes, overalls, etc. Work in the presence of another person.

Unstable vehicles :

Never work underneath or near a vehicle that has been raised using only a jack. When working underneath or near a vehicle that has been jacked up, always make sure that the jack is used in conjunction with stands or other effective supports and that the jack and stands used can bear the weight. Check that the vehicle is perfectly stable and that the forces applied to the vehicle while carrying out maintenance will not cause it to shift. Also check that the ground is firm.

Hot parts :

Some parts, such as brake drums, for example, may become extremely hot in use.

Pressurised hydraulic or pneumatic systems :

NB : Before carrying out maintenance on hydraulic or pneumatic systems, which may be pressurised, take all necessary precautions to avoid accidental pressure release.

Risk of fire, risks from fumes, toxic gases and irritant substances :

All fuel is highly flammable and petroleum vapour is explosive. For cleaning and degreasing parts, use only appropriate, recognised cleaning fluids and follow the instructions on the packaging. Avoid contact with the skin and avoid inhaling vapour, fumes or toxic gases. Do not smoke, use a naked flame or create sparks, etc if there is a risk of explosion or fire owing to the presence of flammable vapours, fuel, oil, paint, solvents, dust, straw, etc. A fire extinguisher appropriate for the type of risk should always be to hand.

Asbestos :

The brake linings of our axles no longer contain asbestos. We used asbestos-free linings well before EU regulations prohibited its use. If there is any doubt about the presence of asbestos (for example, when carrying out maintenance on old axles), the brakes and linings should be handled as if they contained asbestos, as asbestos dust is a major health hazard.

Environment :

We have carefully studied the harmful effects of our products on the environment. Respect the environment and do not dump oil, grease and used chemical products. They should be disposed of in accordance with the regulations at a waste collection point, waste disposal centre or recycling centre.

2. Axles



2.1 General points

The specifications of our axles and suspensions can be found in the general COLAERT ESSIEUX catalogue. The catalogue provides the following information.

Axles :

- The axle cross-section.
- The axle type.
- The axle loads and maximum admissible offset at speeds of 25, 40 and 60 km/h with zero offset wheels, with single, tandem or tridem axles.
- The number and size of studs and the bolt circle.
- The centre hole diameter.
- The brake dimensions (drum internal diameter and lining width).
- The braking characteristics certified by UTAC (France) and TÜV.

The general catalogue also gives the admissible load on the axle assembly for different load offsets.

Exceeding these values may cause excessive bending of the axle and possibly permanent damage.

Stabiliser jacks bearing on the axles, weight transfer devices or lifting axles do not increase the maximum load on the axles or suspensions.

Suspension :

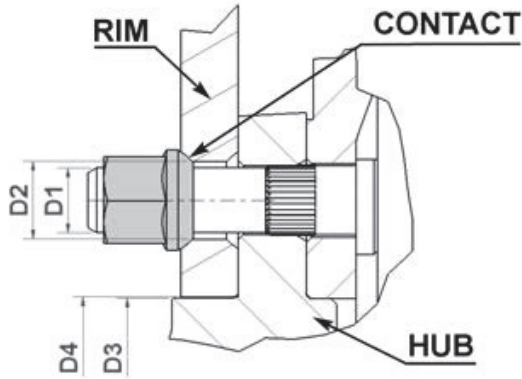
- The maximum load for the suspension.
- The wheel-base.
- The type of spring, the number of leaves and the number of fixed leaves.
- The height of the axle assembly unladen and laden, for different axle cross-sections.

2. Axles

2.2 Axle, maintenance and adjustment

2.2.1 Assembly and fixing of the wheels

NUT DIN



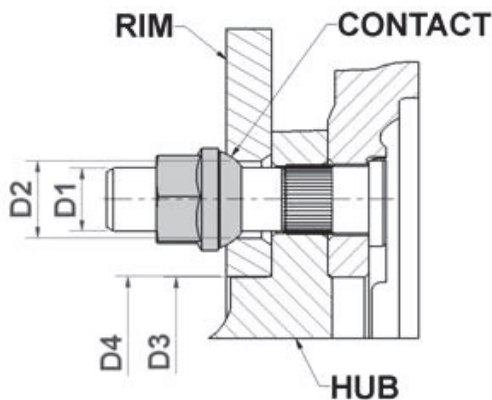
Mounting :

Rim holes must be chamfered to set the spherical base of the nut DIN.

The tightening is getting between spherical base of the nut and the rim chamfering.

Spanner	Nb stud x Ø interaxial	Wheel stud D1	Tightening	Leverage (*L)	Force (*F)	Ø Hole rim D2	Ø Hub D3	Ø Inner rim D4
mm	mm	mm	Nm	mm	Kg	mm	mm	mm
17	4 x Ø95	M12x1.5	90 (+10/0)	300	30	16	62	63
19	5 x Ø140	M14x1.5	130 (+10/0)	300	40	18.5	93	94
24	6 x Ø205	M18x1.5	270 (+20/0)	450	60	21.5	160	161
24	8 x Ø275	M18x1.5	270 (+20/0)	450	60	21.5	220	221

H NUT + WASHER



Mounting :

Rim holes must be chamfered to set the spherical base of the washer.

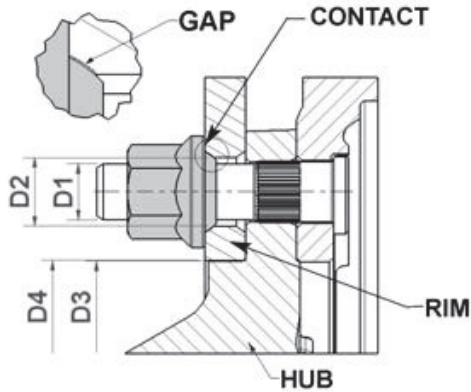
The tightening is getting between spherical base of the nut and the rim chamfering.

Spanner	Nb stud x Ø interaxial	Wheel stud D1	Tightening	Leverage (*L)	Force (*F)	Ø Hole rim D2	Ø Hub D3	Ø Inner rim D4
mm	mm	mm	Nm	mm	Kg	mm	mm	mm
27	8 x Ø275	M18x1.5	270 (+20/0)	450	60	21.5	220	221
30	8 x Ø275	M20x1.5	350 (+30/0)	600	60	27	220	221
30	10 x Ø335	M22x1.5	450 (+60/0)	800	60	27	280	280

2. Axles



BEC NUT



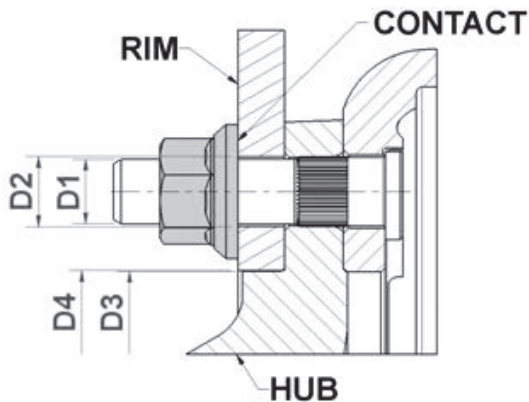
Mounting :

Rim holes must be chamfered to set the spherical base of the type 'French'.

Spherical base of this nut is to locate the rim and not of tightening. To not respect this, can seriously damaged the studs threading.

Spanner	Nb stud x Ø interaxial	Wheel stud D1	Tightening	Leverage (*L)	Force (*F)	Ø Hole rim D2	Ø Hub D3	Ø Inner rim D4
mm	mm	mm	Nm	mm	Kg	mm	mm	mm
29	8 x Ø275	M18x1.5	270 (+20/0)	450	60	21.5	220	221
32	10 x Ø335	M22x1.5	450 (+60/0)	800	60	27	280	281

- M - NUT



Mounting :

Holes rim must not be chamfered.

The wheel locate by the hub reference diameter and the tightening by the flat revolving part of the nut (see contact face on sketch).

Not forget to set bushes item 1, to reduce the gap between the stud and the rim hole).

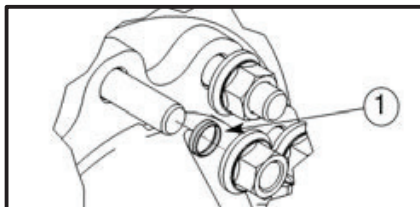
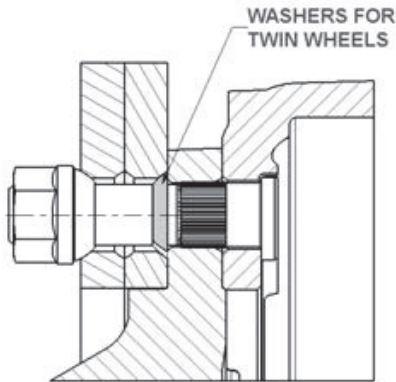


figure. a

Spanner	Nb stud x Ø interaxial	Wheel stud D1	Tightening	Leverage (*L)	Force (*F)	Ø Hole rim D2	Ø Hub D3	Ø Inner rim D4
mm	mm	mm	Nm	mm	Kg	mm	mm	mm
28	8 x Ø275	M18x1.5	270 (+20/0)	450	60	21	220.5	221
32	10 x Ø335	M22x1.5	450 (+60/0)	800	60	26	280.8	281
36	10 x Ø335	M24x1.5	550 (+60/0)	920	60	27	280.8	281

2. Axles

TWIN WHEELS



Mounting :

For the twin wheels fitting, what even the use of nut type, French or H + washers, you must insert between hub face and first rim, a locating split spherical washer fully in the chamfering.

The wearing face of the rim must be in total contact with hub face.

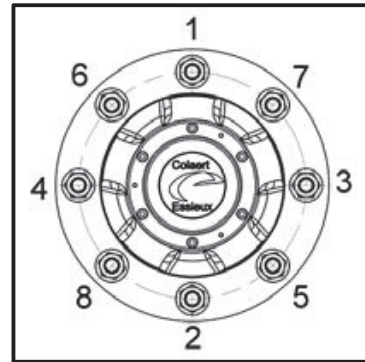
2.2.2 Tightening and retightening wheel nuts

Never use impact wrenches to tighten the wheel nuts as the impact torque may be excessive.

Wheel nuts should be tightened *diagonally* using a *torque wrench*.

If power tools are used (for example, pneumatic torque wrench) they must be carefully set to the required torque for tightening.

Otherwise, the studs and wheel nuts may be over tightened which may damage or break them.



Retighten the wheel nuts after :

- The first time of use.
- The first laden journey.
- The first 1,000 km.
- Every 6 months or 25,000 km.

Repeat every time the wheels are changed or removed.

2.2.3 Checking the hubcaps

Missing or damaged hubcaps must be replaced immediately to avoid dirt penetrating into the hub which might result in damage to the bearings.

Check that the hub caps are in place and in perfect condition.

For press fit hubcaps, check visually that they are fully home.

For hubcaps attached using screws, fit a new gasket if necessary when the hubcap is removed and retighten the screws regularly (every 6 months).

2.2.4 Checking the wheel bearing clearance

- After the first 1,000 km.
- Before intensive use, every 6 months or 25,000 km.

Wheel bearings are subject to wear : their lifetime depends on the operating conditions, the load, the speed, the adjustment and lubrication, etc.

2. Axles



To check the wheel bearings :

- Lift the wheel off the ground.
- Turn in both directions slowly to check for any rough points or friction.
- Turn it at high speed to check for unusual noises, such as grating or knocking.

If the bearing is damaged or worn, the bearing and seals should all be replaced (see paragraph 2.2.7 Replacing the wheel bearings).

To check the wheel bearing clearance, raise the axle until the wheel is no longer resting on the ground (**ensure that the vehicle cannot move**).

Release the brake, grip the wheel at the top and the bottom and check the clearance by trying to tilt it. The clearance can also be detected by using a lever between the wheel and the ground.

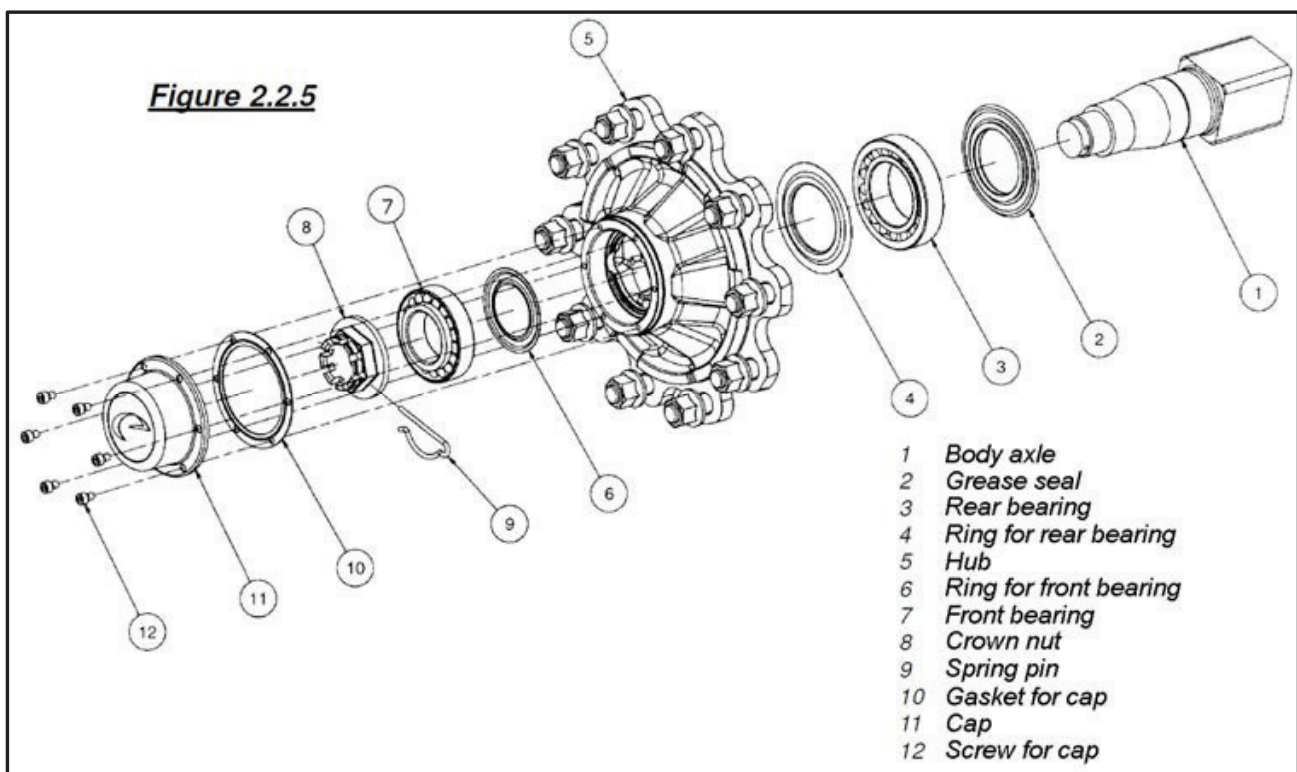
If you can feel any clearance, adjust the wheel bearing (see paragraph 2.2.5 Adjusting the wheel bearings).

Make sure that the clearance does not come from the suspension or a steering axle Steering pivot.

2.2.5 Adjusting the wheel bearings

Lift the axle until the wheel is no longer resting on the ground.

Large wheels should be removed so that the clearance is easier to feel and to make it easier to adjust the bearings.



- Remove the hubcap.
- Remove the cotter pin or hair-pin clip from the spindle.
- Tighten the castle nut (right-hand thread) to take up the internal clearance (the conical roller bearings should then be firmly held between the hub seating, the pressure ring, spindle and castle nut).

2. Axles

The rotation of the hub or wheel feels to be slightly stiff :

- Slacken the castle nut until there is no longer any friction between the castle nut and the outer bearing and the hole for the pin is aligned with a notch in the castle nut.
- Tap the hub gently using a mallet to shake down the assembly.
- Check that the hub rotates more freely.
- Always err on the side of too free rather than too tight.
- When the hub has been adjusted, fit a new split cotter pin or re-fit the hair-pin clip.
- Refit the hubcap.
- Refit the wheel following the instructions in paragraphs 2.2.1 (Fitting wheels) and 2.2.2 (Tightening and retightening wheel nuts).

When the wheel has been refitted, turn it slightly. It should come to rest with a slow rocking movement due to the imbalance.

2.2.6 Lubricating the wheel bearings

In normal operating conditions, lubricate the bearings every 2 years or every 50,000 km and when the brake shoes are replaced. In harsh conditions the bearings should be lubricated more frequently.

Use a general purpose EP grease formulated for lubricating plain, ball and roller bearings, subject to heavy loads and impacts typical of HGV, agricultural vehicle hubs, etc.

All parts (hub, spindle, bearings, seals, castle nuts, hubcap, cotter pin) should be degreased and perfectly clean before reassembly.

The work should be carried out in a clean environment with appropriate tools as the slightest bit of dirt can damage the bearings or even the spindle.

When carrying out maintenance on the bearings, check the brake linings, drum and return springs, clean the brakes, clean and lubricate the brake cam shaft.

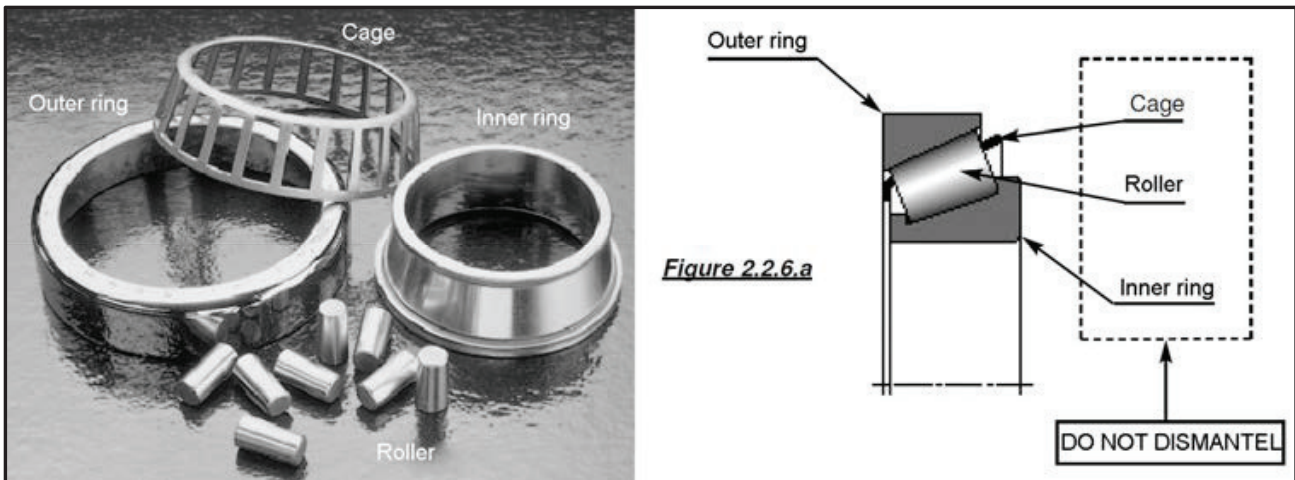


figure 2.2.6.a

Disassembly : (See [figures 2.2.5](#) and [2.2.6.a](#))

- Slacken the wheel nuts.
- Lift the axle until the wheel is off the ground.
- Remove the wheel.
- Release the brakes (**make sure that the vehicle cannot move**).

2. Axles

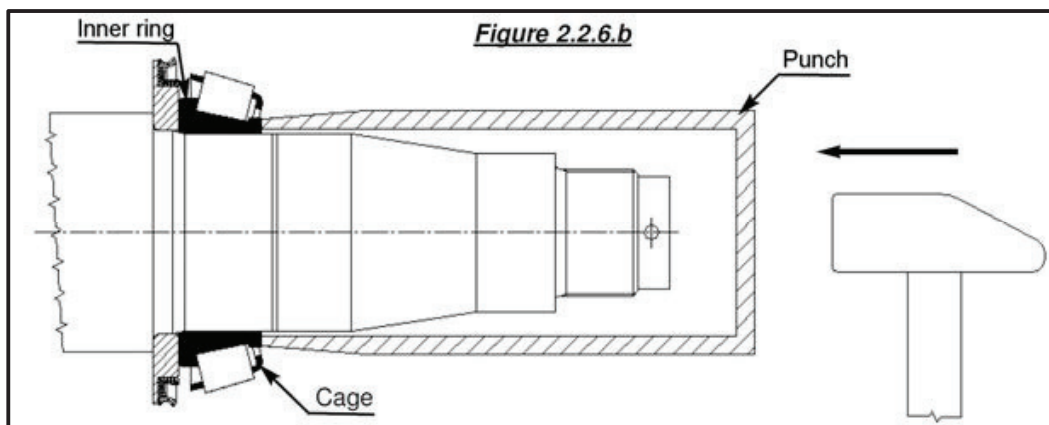


- Remove the hubcap.
- Remove the split pin or pin from the spindle.
- Remove the castle nut.
- Remove the drum/hub assembly. using a hub puller if necessary : the outer ring, the grease retaining plates inside the hub (depending on the model), the small bearing cone and cage come with the hub. Check these parts. The bearing cups and grease retaining plates can be left inside the hub for cleaning.
- Remove the large bearing cage and cone from the spindle using a bearing puller if necessary.
- Check the oil seal between the spindle and the large bearing (or the wheel bearing seal depending on the model), and replace these parts if necessary. A puller may be required to remove the wheel bearing seal. Note the orientation of the oil seal for reassembly.
- Check the contact surfaces on the spindle for the bearing and seal and the threaded end of the spindle and remove any bumps or asperities.
- Check the hub surfaces in the same way.
- Check the bearing face of the castle nut.

Clean and degrease all parts with a suitable cleaning fluid.

Reassembly :

- Grease the spindle lightly.
- Refit the oil seal or wheel bearing seal (ensure that the seal is the right way round), a punch makes it easier to fit the wheel bearing seal and avoids damaging the seal.
- Apply a generous coating of grease to the large bearing cage and rollers, making sure that the grease penetrates all round the rollers and under the cage.
- Fit at bottom the interior ring (cone) of the large bearing on the spindle, it is important to take care not to damage the cage of the bearing, to go up the cone unit, rollers and cage (*figure 2.2.6.a*) on spindle to use if necessary tools as shown in the *figure 2.2.6.b*, the effort to push must apply only to the cone, in no case on the cage or the rollers what involves a deterioration of the bearing.
- Apply a 15 mm (small axles) or 20 mm (large axles) layer of grease all around and right across the large and small bearing cups that are still in the hub.
- If the hub does not have grease retaining plates, put a large amount of grease in the centre of the hub to act as a reservoir.
- Slide the hub/drum assembly over the spindle and the brake shoes keeping the hub perfectly straight and aligned until it is in contact with the oil seal at the back of the spindle.
- Apply a generous layer of grease to the small bearing cage and rollers and fit the assembly to the spindle.
- Fit the castle nut and adjust it as described above (See paragraph 2.2.5 Adjusting the wheel bearings).
- Lock the castle nut with a hair-pin clip or new split cotter pin as appropriate.
- For hubs without grease retaining plates, fill the hubcap with grease.
- Refit the hubcap.



2. Axles

2.2.7 Replacing the wheel bearings

New grease retaining plates should be fitted to hubs with grease retaining plates (See [figure 2.2.5](#)), as the plates will be damaged while removing the bearing cups.

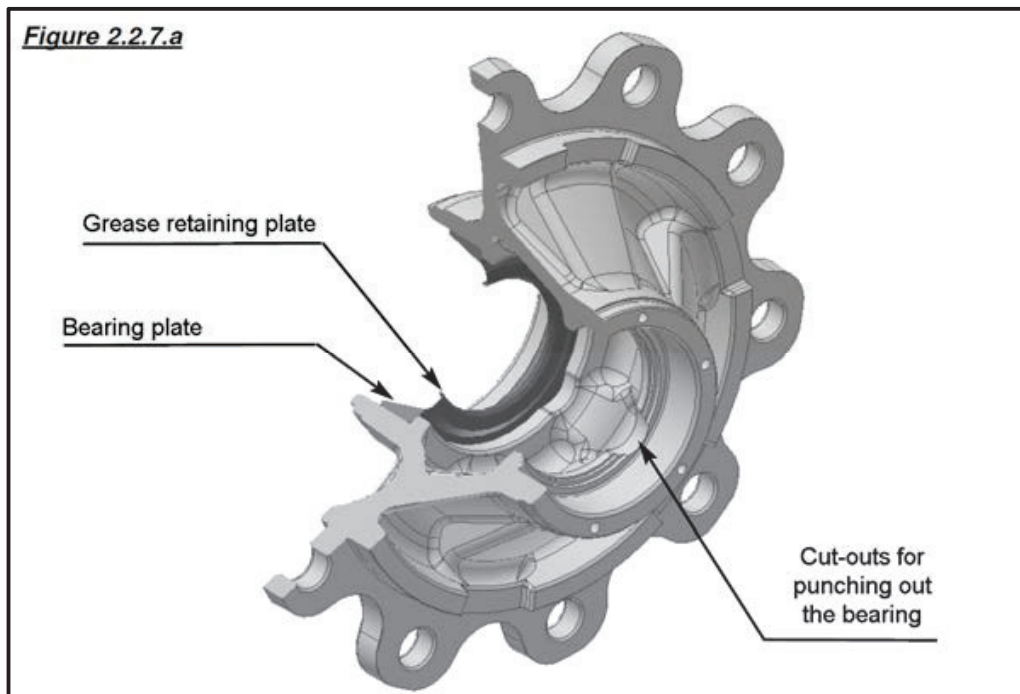
Unpack the bearings at the last moment and never mix them up.

To replace the wheel bearings, follow the instructions for removing the hub (see paragraph 2.2.6 Lubricating the wheel bearings) and remove the bearing cups from the hub as follows.

Removing the bearing cups from the hub :

Note the orientation of the bearing cups and grease retaining plates for reassembly.

- The bearing cups are an interference fit and must be punched out using a hammer and a mild steel punch (See [figure 2.2.7.a](#)).
- If the hub has grease retaining plates, these will be punched out at the same time as the bearing cups and will, therefore, be damaged.



Fitting new bearing cups into the hub :

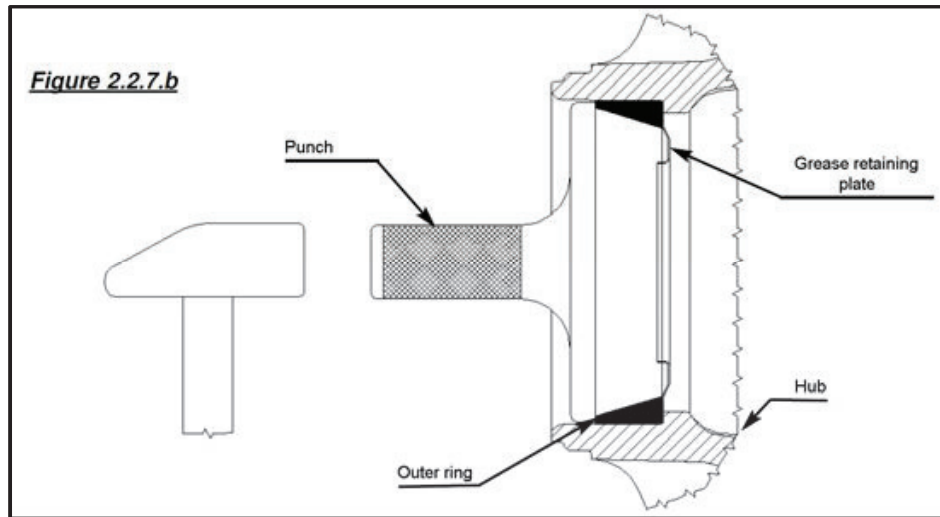
Make sure that the bearing cups and grease retaining plates are the right way round.

NB : Never fit the bearing cup with the bearing cone and rollers in place

- If the hub has grease retaining plates, first put the grease retaining plate in its seating (the right way round) and ensure that it remains well centred and in place while the bearing cup is being fitted. Re-check when the operation is complete.
- Fit the bearing cups and punch into place using a mild steel punch as shown in [figure 2.2.7.b](#).

Take care that the bearing cups are straight and that they are firmly against the seating in the hub.

2. Axles



2.3 Brake maintenance and adjustment

2.3.1 Initial checks

The brakes should be tested before using for the first time and after the first laden journey :

- Check the actuator and return spring mountings, check the actuator stroke and return travel and check that the road and parking brakes operate and release correctly.
- Tighten the screws and nuts (covers, fulcrum, etc), check the cotter pins, pins, circlips, etc.
- Check for hydraulic fluid and air leaks.

2.3.2 Checking brake clearance and wear

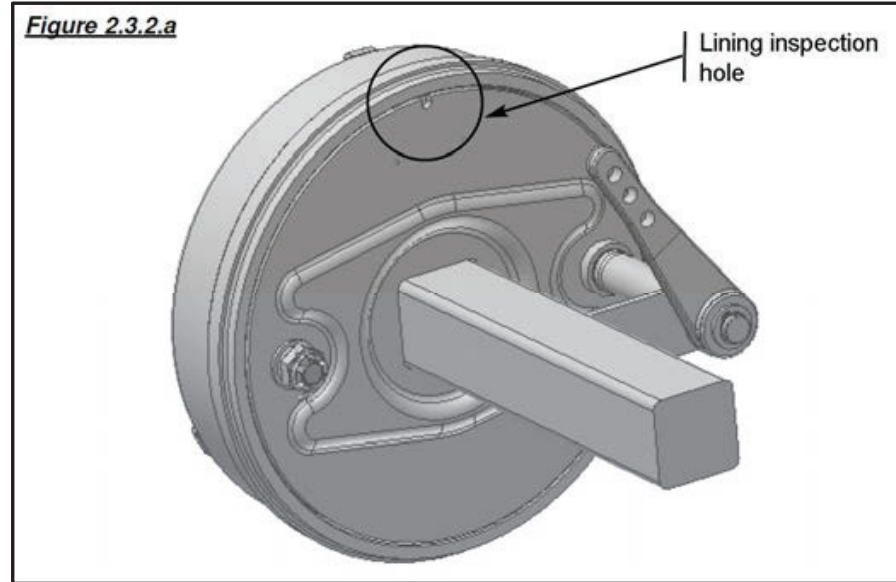
Check and test the brakes before intensive use and every 3 months :

- Check the brake wear and the clearance between the brake linings and the drum visually (See [figure 2.3.2.a](#)). It is probable that the linings are worn when the actuator travel has increased significantly.
- Check the thickness of the brake linings (See table paragraph 2.3.5 Replacing the brake shoes for the minimum thickness).

The brake shoes should be replaced as soon as the minimum lining thickness is reached.

- Check that the brakes are clean and clean them if necessary.
- Lubricate brake cam shaft bearings with grease nipples lightly to avoid grease deposits on the brake linings and drums.
- Carry out the initial checks described above (See paragraph 2.3.1 initial checks).

2. Axles



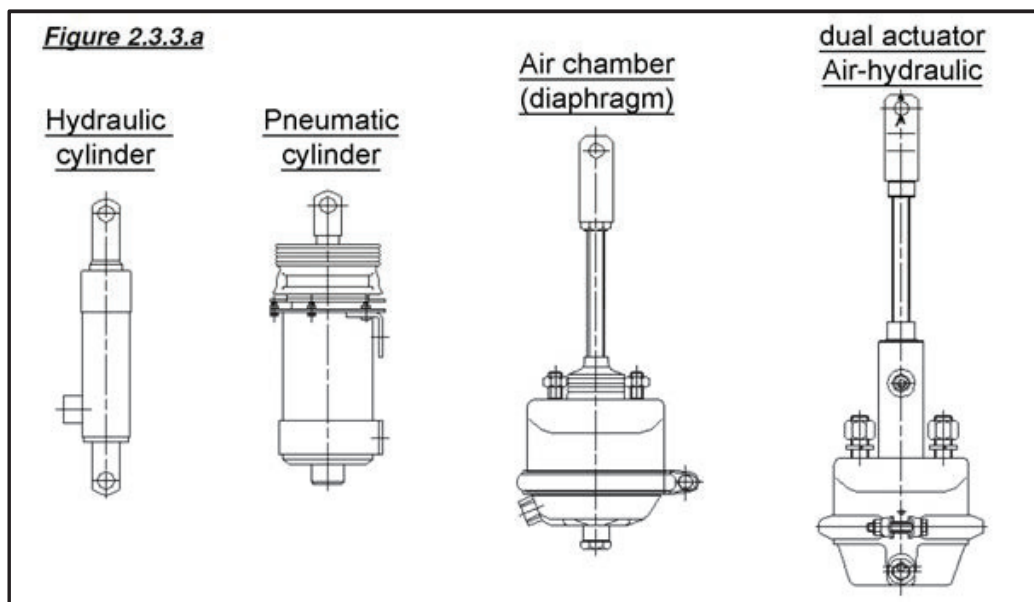
2.3.3 Adjusting brakes with fixed levers

Take up the slack when the actuator stroke reaches about two thirds of the maximum travel (See [figure 2.3.3.a](#)).

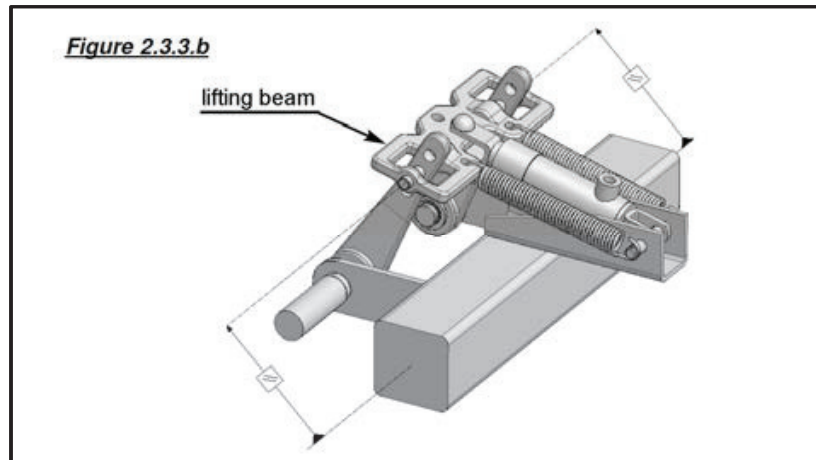
To take up the slack, turn the lever by one or more notch, ensuring that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorisation from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole).

For braking systems with a yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied (See [figure 2.3.3.b](#)). This means that the stroke of the levers on the brakes at each side must be identical. Otherwise, the brake slack must be adjusted.



2. Axles



2.3.4 Adjusting brakes with adjustable levers

Take up the slack when the actuator stroke reaches about two thirds of the maximum stroke (See also paragraph 2.3.3 Adjusting brakes with fixed levers).

To take up the slack, turn the adjustment screw on the lever to adjust the relative position of the cam and the lever (See [figure 2.3.4](#)).

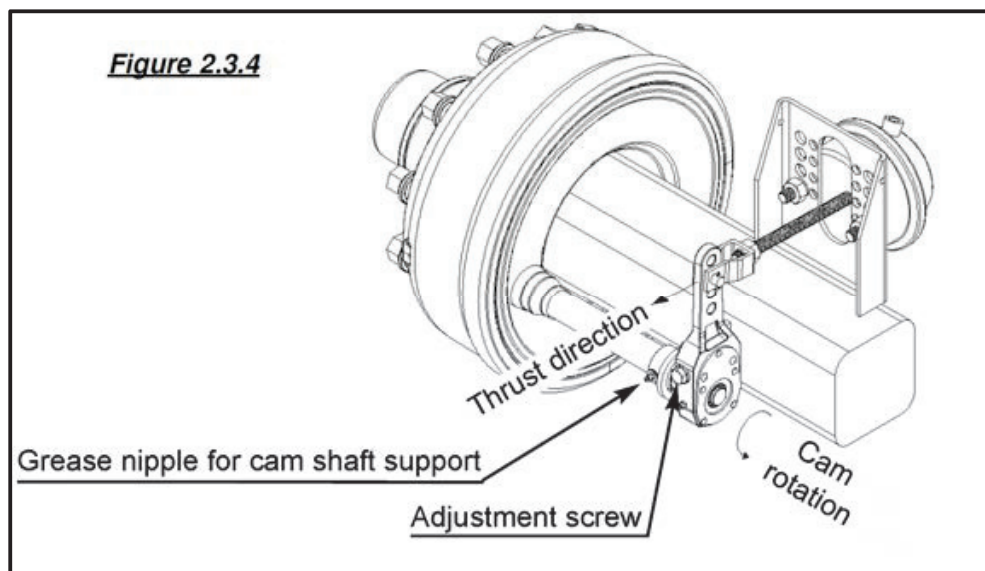


NB : The actuator brakes by pushing the lever to turn it in a particular direction. The screw must be adjusted so that the cam moves in this direction to take up the slack. The direction in which the screw must be turned depends on the configuration.

Ensure that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorisation from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole)

For braking systems with a tandem yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied (See [figure 2.3.3.b](#)). This means that the stroke of the levers on the brakes at each side must be identical. Otherwise, the brake slack must be adjusted.



2. Axles

2.3.5 Replacing the brake shoes

The brake shoes should be replaced as soon as the minimum lining thickness is reached.

When replacing the brake shoes, repack the wheel bearings with grease (See paragraph 2.2.6 Lubricating the wheel bearings).

Minimum lining thickness		
Brake type	Dimensions (Drum internal diameter and lining width)	Minimum lining thickness (mm)
A25	250 x 60	2
A30	300 x 60	2
309E	300 x 90	2
310E	300 x 100	5
314E	300 x 135	5
316	300 x 160	5
3020S	300 x 200	5
356E	350 x 60	2
359E	350 x 90	2
A320	350 x 60	2
A410	355 x 80	2
A61	400 x 80	2
408E	400 x 80	2
314S	300 x 135	5
A910	406 x 120	5
A940	406 x 140	5
412S	406 x 120	5
412E	406 x 120	5
414S	406 x 140	5
414E	406 x 140	5
4218S	406 x 180	5
4218E	406 x 180	5
4220S	406 x 200	5
4220E	406 x 200	5
5218E	520 x 180	5

See paragraphs 2.2.5 Adjusting the wheel bearings and 2.2.6 Lubricating the wheel bearings for hub disassembly and reassembly and wheel bearing lubrication and adjustment.

When replacing the brake linings, check all the brake components.

- Condition of the drums.
- Condition of the cam shafts and levers, in particular check the clearance in the splines.
- Wear on the bushings.
- Condition of the bellows (depending on the model).
- Condition of the shoe return springs.
- Condition the fulcrums and their mountings (depending on the model).
- Check the rotation of the brake shoe rollers (if fitted) and lightly lubricate before reassembly.

2. Axles



Always replace any worn or damaged parts.

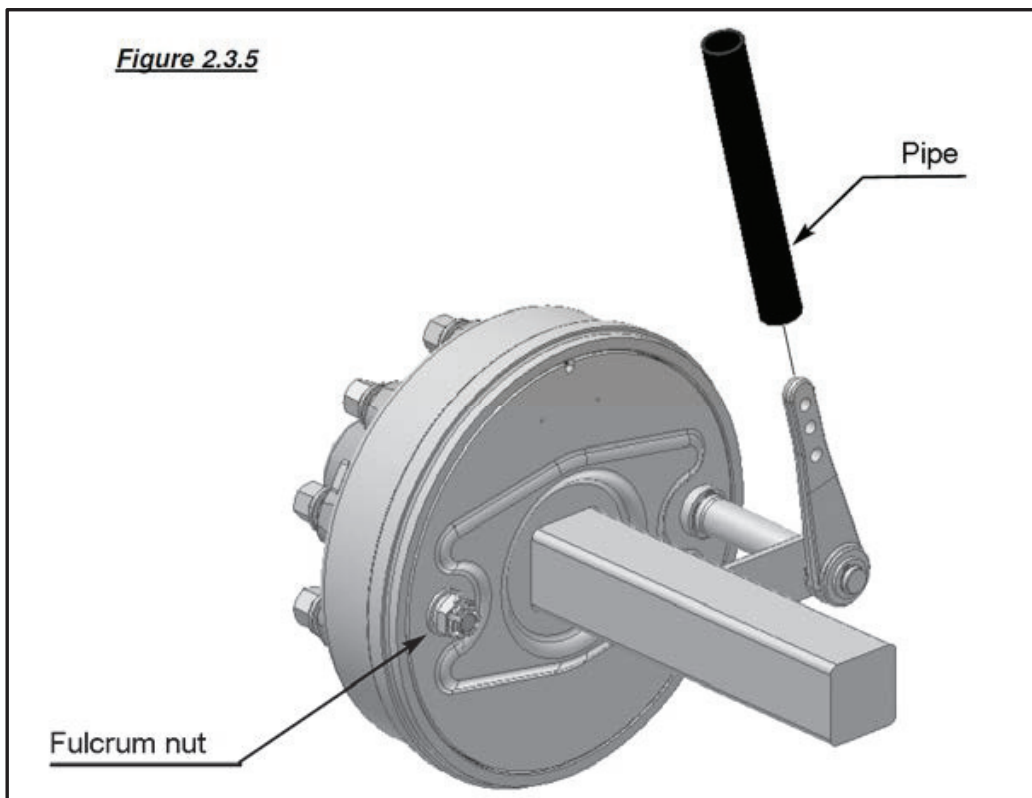
When reassembling, apply a thin coat of grease to all contact surfaces (cams, fulcrums, bushings, etc) being careful to avoid getting any grease on the drums and shoe linings.

For brakes with an adjustable fulcrum, centre the brake shoes before clamping the fulcrum :

When the hub/brake assembly has been reassembled, slacken the fulcrum nut slightly, operate the brake lever in the correct direction (direction of the actuator thrust) by pulling on the lever by hand. (it is easier if a pipe is placed over the lever as shown in figure 2.3.5) to press the shoes against the drum.

Clamp the fulcrum while pressing on the lever.

If the nut is locked using a split cotter pin, always use a new cotter pin.



3. Steering axles

3.1 General points

Steering axles have a suspended traverse with two spindles that can swivel about a Steering pivot. This can considerably reduce tire wear, improve the manoeuvrability of trucks and trailers and significantly reduce parasitic forces on the chassis and wheels.

They are particularly useful for large vehicles with several axles. The wheel alignment is finely controlled by a tie rod which is adjusted by turning the tie rod that has a left-hand thread at one end and a right-hand thread at the other or by turning a flexible eccentric bushing, depending on the model.

There is a shock absorber to reduce oscillations and stabilize the mechanism. The two blocking cylinders are used to straighten the wheels just **BEFORE** reversing. They can also be used on steep cambers or on particularly rough surfaces (bumps, potholes, etc).

3.2 Classic steering axles

Classic steering axles have two cylinders, single-acting or double effect, for realignment and blocking. They are also equipped with one or two shock absorbers.

3.2.1 Routine maintenance

Steering axles should be maintained as for standard axles (See paragraphs 2.2 Axle maintenance and adjustment and 2.3 Brake maintenance and adjustment) as well as carrying out the maintenance and adjustments required for steer axles described below.

Before intensive use and every 3 months : (See *figure 3.2.1*)

- Lubricate the Steering pivots.
- Tighten the screws and nuts and all parts mounted on the axle (chambers, cylinders and mountings, locking cylinders, shock absorber, tie rod, etc).
- Tighten the blind nut and lock nut on the locking cylinders (see paragraph 3.2.3 Locking cylinder maintenance and adjustment).
- Tighten the lock nuts at the end of the tie rod (See paragraph 3.2.2.1 Steer axle with adjustable length tie rod) or the clamping screw for the flexible bushing (See paragraph 3.2.2.2 Steer axle with eccentric flexible bushings) depending on the model.
- Check the flexible bushings on the tie rod and shock absorber and change them if necessary.
- Check that the tie rod has not been accidentally bent as this adversely affects the steer axle, in particular the wheel alignment.
- Check the full-lock angle limit screws on the axle, if appropriate.
- If the steer axle oscillates, check the shock absorber. Oil traces do not indicate that the shock absorber is unserviceable but a major oil loss will result in its failing. Uncouple it at one end and push it in and out by hand for the whole travel. If there is little resistance, replace the shock absorber. Also replace the shock absorber if it is badly dented.
- Ensure that the shock absorber is mounted the right way round. A new shock absorber should have the **label at the top** as shown in *figure 3.2.1*
- Look for and correct any leaks of air or hydraulic fluid from the chambers, cylinders and shock absorber.

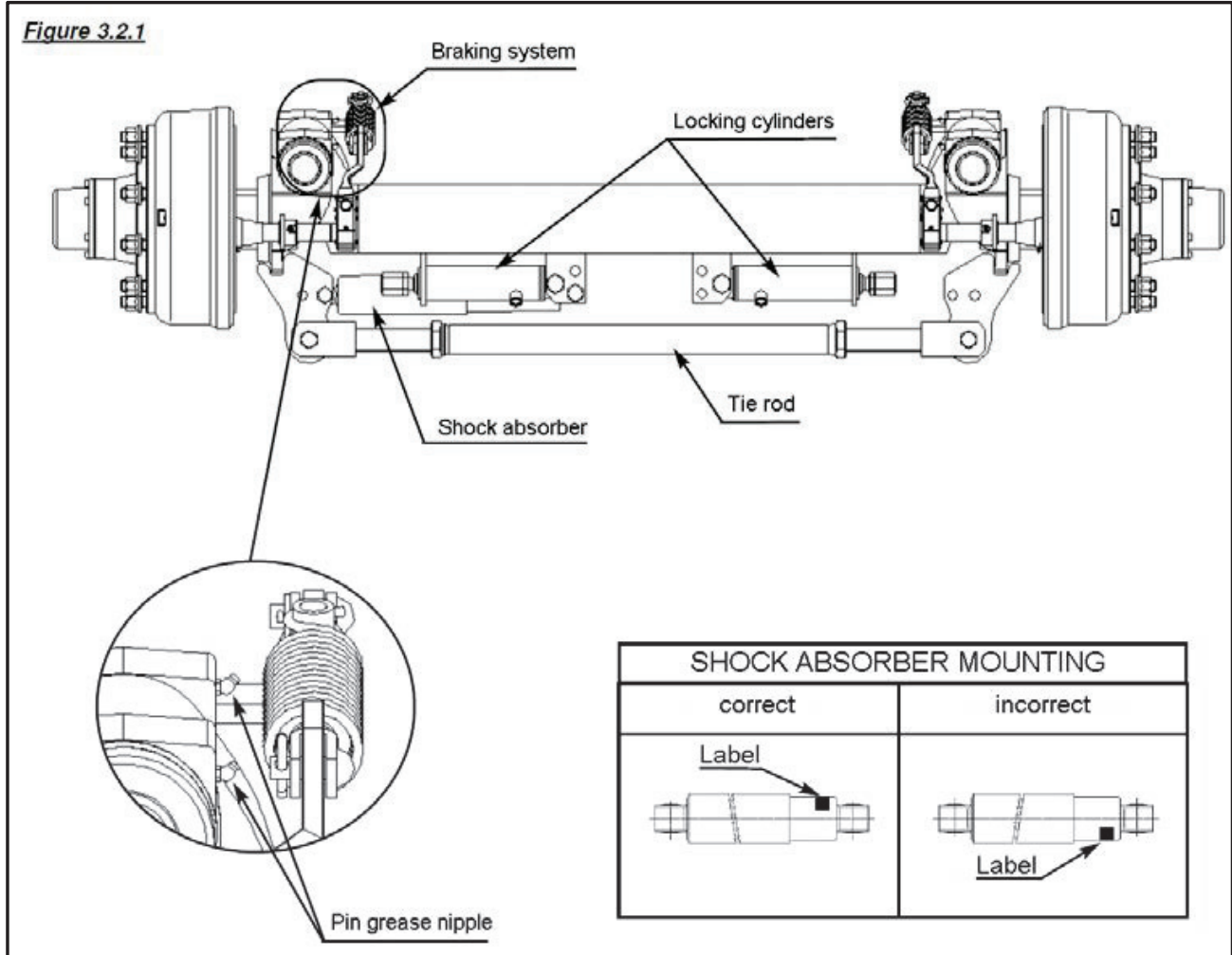


NB : Before carrying out any work on hydraulic or pneumatic systems, take all necessary precautions to ensure that the hydraulic fluid or air is not under pressure. For steering axles with conical Steering pivots : check and adjust the clearance

3. Steering axles



For steering axles with conical pivot axis : control and catch the gab : see paragraph 3.2.4 (Adjusting the clearance, steering axles with tapered pins only).



3. Steering axles

3.2.2 Checking and adjusting the wheel alignment

- Steering axle with adjustable length tie rod (see figure 3.2.2.1)

Before adjusting the wheel alignment, check that the flexible bushings at the ends of the tie rod are in good condition and replace them if necessary.

Align the wheels with the vehicle on a smooth, level surface.

The wheel alignment must be adjusted with the locking cylinder pistons retracted.

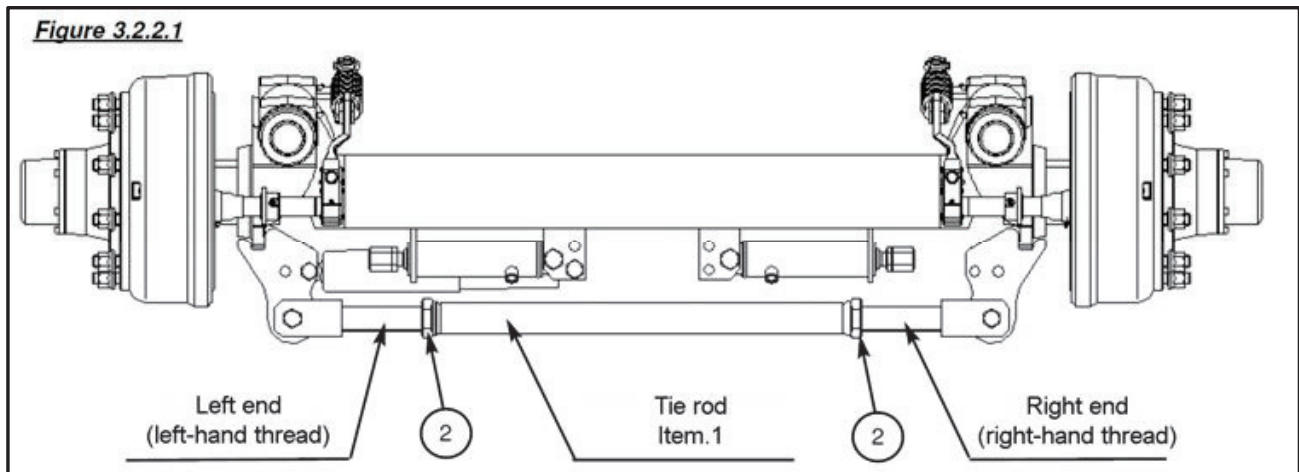
- Measure the distance between the rim at the front of the wheels and at the back of the wheels : the distance should be the same.
- Move the vehicle forward to turn the wheels through 180° and repeat the check to allow for bent wheels.

If the wheel alignment is not perfect, adjust it as follows.

With the locking cylinder pistons still retracted

During the setup process, check the wheel alignment of the steering axle relative to the wheels of the rigid axle using a control rule. (Warning : what is important is that the wheels are aligned between them. It may be that the track of the axles are somewhat different without causing a fault parallelism).

- Slacken the 2 lock nuts Item 2 on the end of the tie rod Item 1.
- Turn the tie rod to pull or push the wheels until the distances are the same. The wheels may be set to have a slight toe in (distance at the front less than the distance behind) of no more than about 4 mm but never adjust with toe out.
- Lock the lock nuts Item 2 when the tie rod has been adjusted and then adjust the locking cylinders (See paragraph 3.2.3 Locking cylinder maintenance and adjustment).



3. Steering axles



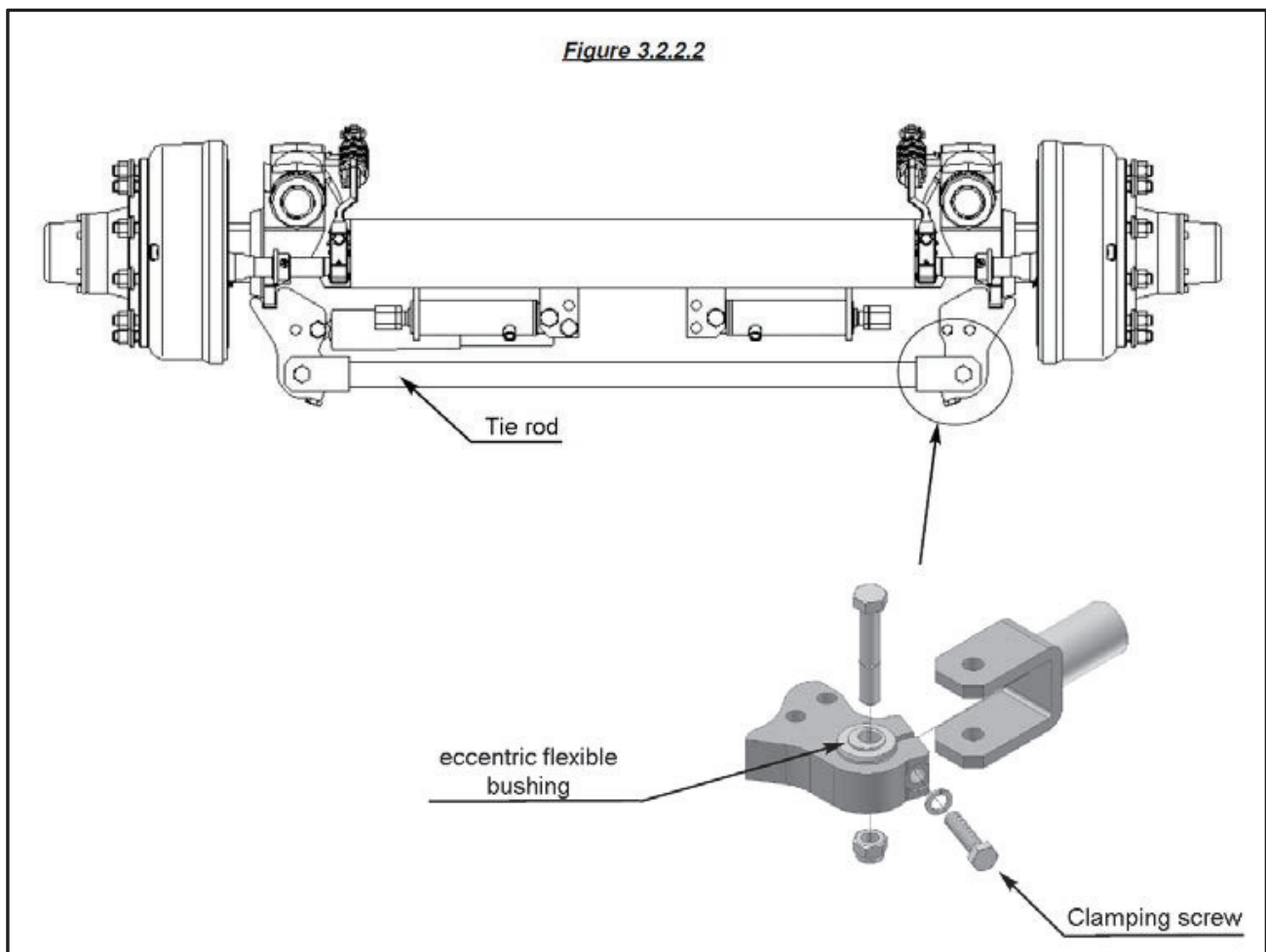
- Steering axles with eccentric flexible bushings (see figure 3.2.2.2)

In this case the length of the tie rod is fixed and the wheel alignment is adjusted using the flexible bushings at the ends of the tie rod. The mounting hole in the flexible bushing is eccentric.

During the setup process, check the wheel alignment of the steering axle relative to the wheels of the rigid axle using a control rule. (Warning : what is important is that the wheels are aligned between them. It may be that the track of the axles are somewhat different without causing a fault parallelism).

The wheels are aligned by slackening the screw clamping the flexible bushing and then turning the flexible bushing in its housing. Follow the instructions in paragraph 3.2.2.1 (Steer axle with adjustable length tie rod).

Retighten the clamping screw after adjustment.



3. Steering axles

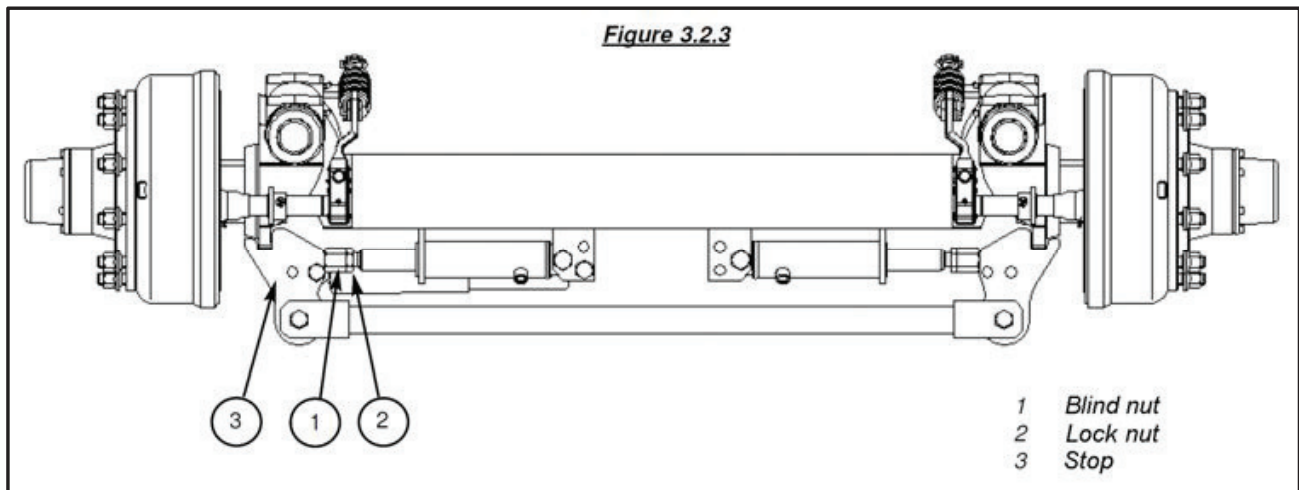
3.2.3 Maintenance and servicing for blocking cylinders

The blocking cylinders straighten the wheels and hold them straight.

Tighten the lock nut Item 2 against the blind nut Item 1 regularly (*figure 3.2.3*).

Adjust the blocking cylinders after aligning the wheel (See paragraph 3.2.2 Checking and adjusting the wheel alignment).

proceedings : (see *figure 3.2.3*)



- Move the lock nuts Item 2 and the blind nuts Item 1 as close as possible to the body of the ram.
- Without operating the blocking cylinders, align the steer axle and the vehicle on a smooth, level surface.
- Pressurise the rams and maintain the pressure.
- Screw the blind nuts Item 1 to contact the stops Item 3 without forcing.
- Screw the lock nuts Item 2 to contact the blind nuts Item 1.
- Tighten the lock nuts Item 2 firmly.
- Check that the wheels are still aligned.

The only maintenance required for the blocking cylinders is to keep them perfectly clean, in particular the surface of the ram rod.

If the seals are leaking, they can be replaced (contact the vehicle manufacturer).



NB : Before carrying out any work on hydraulic or pneumatic systems, take all necessary precautions to ensure that the hydraulic fluid or air is not under pressure.

3. Steering axles



3.2.4 Adjusting the clearance

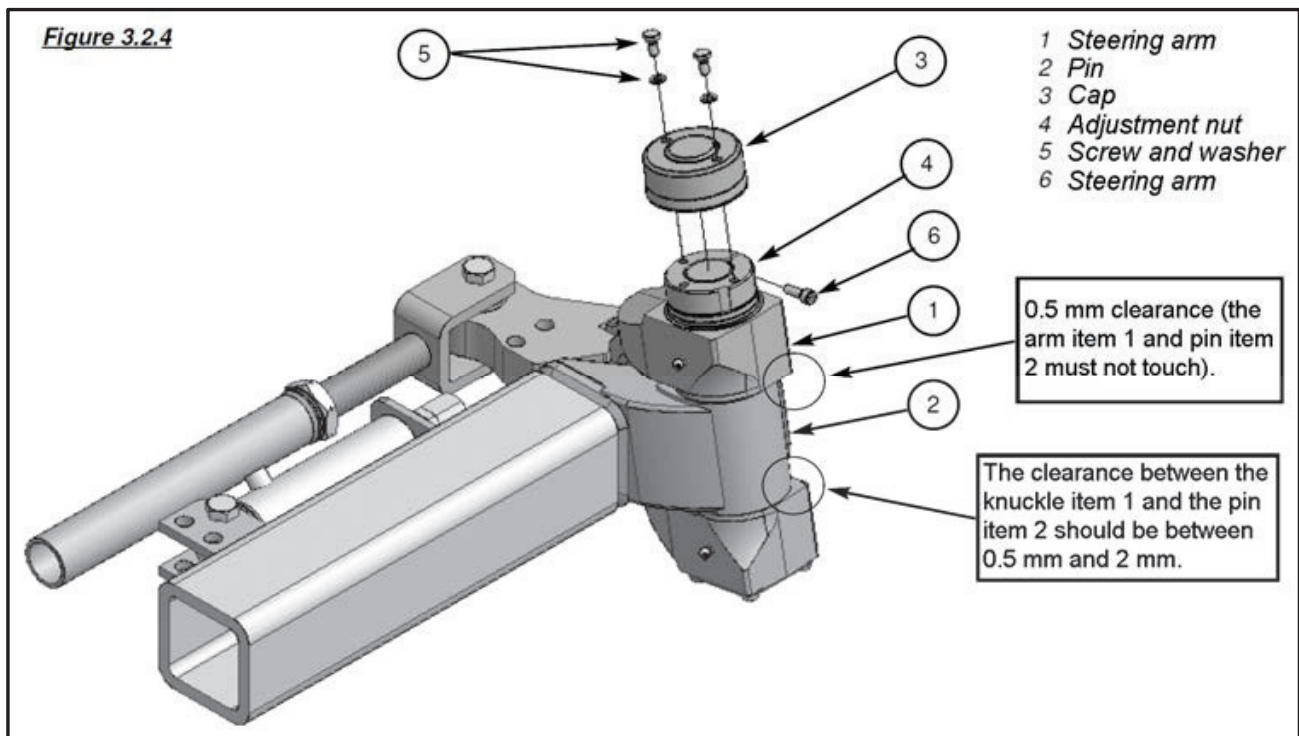
(only for steering axles with conical pins)

Before intensive use and every year :

- For steer axles with conical Steering pivots (this type of axle has pressed steel caps *Item 3* over the adjustment nuts *Item 4*).
- Check and, if necessary, adjust the clearance. It should be between 0.5mm and 2mm (see [figure 3.2.4](#)). The clearance should be adjusted before it falls below 0.5mm.

(See [figure 3.2.4](#))

- Remove the 2 screws and washers *Item 5* and the cap *Item 3*
- Slacken the clamping screw *Item 6* on the adjustment nut *Item 4*
- Adjust the clearance using the adjustment nut *Item 4*
- Tighten the screw *Item 6* and refit the cap *Item 3*



3. Steering axles

3.2.5 Adjusting the full-lock angle

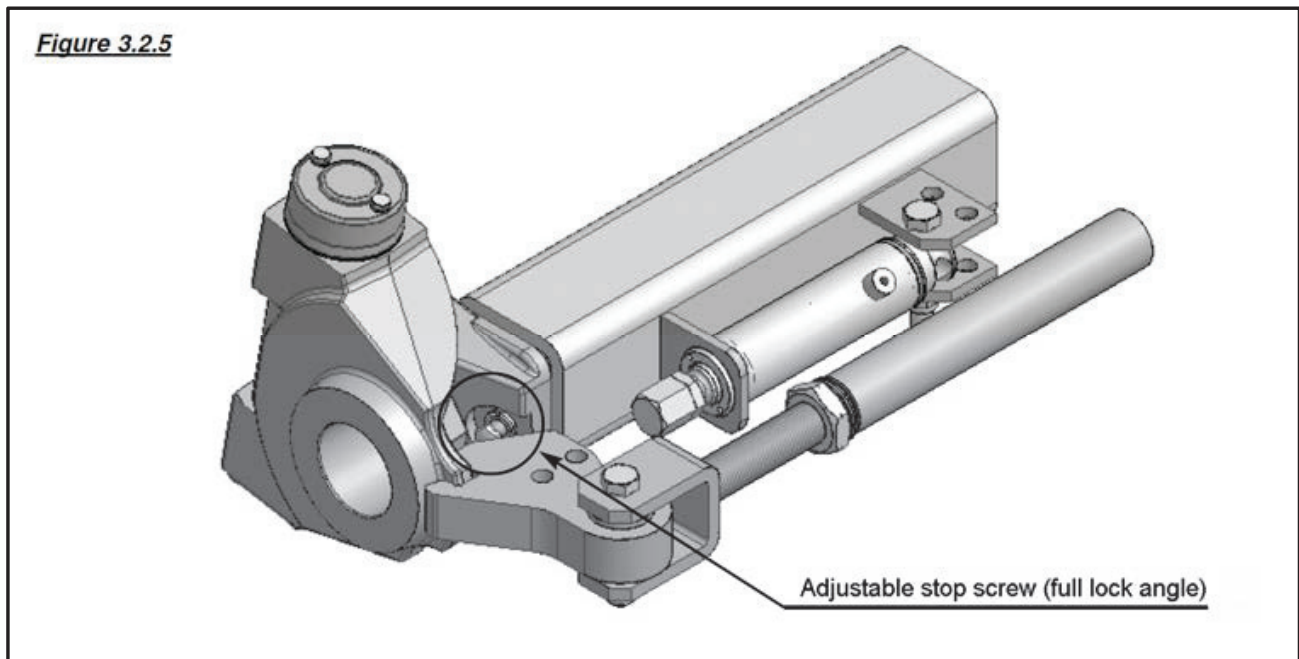
(depending on the model)

Adjust the full-lock stop screws to limit the axle full-lock angle when fitting wide tyres.

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 or suspension as this might wear or damage the tyres.

Adjust the full-lock stop screws, if appropriate. (see [figure 3.2.5](#))

Tighten the lock nuts.



3.3 Driven steering axle

The vehicle manufacturer is responsible for designing and fitting the hydraulic system for hydraulic steered axles.

To align a steered axle, bleed the hydraulic circuit or carry out any other maintenance on the hydraulic system, see the vehicle manufacturer's manual.

The vehicle manufacturer is responsible for checking and adjusting the steered axle geometry.



NB : Before carrying out any work on hydraulic or pneumatic systems, take all necessary precautions to ensure that the hydraulic fluid or air is not under pressure.

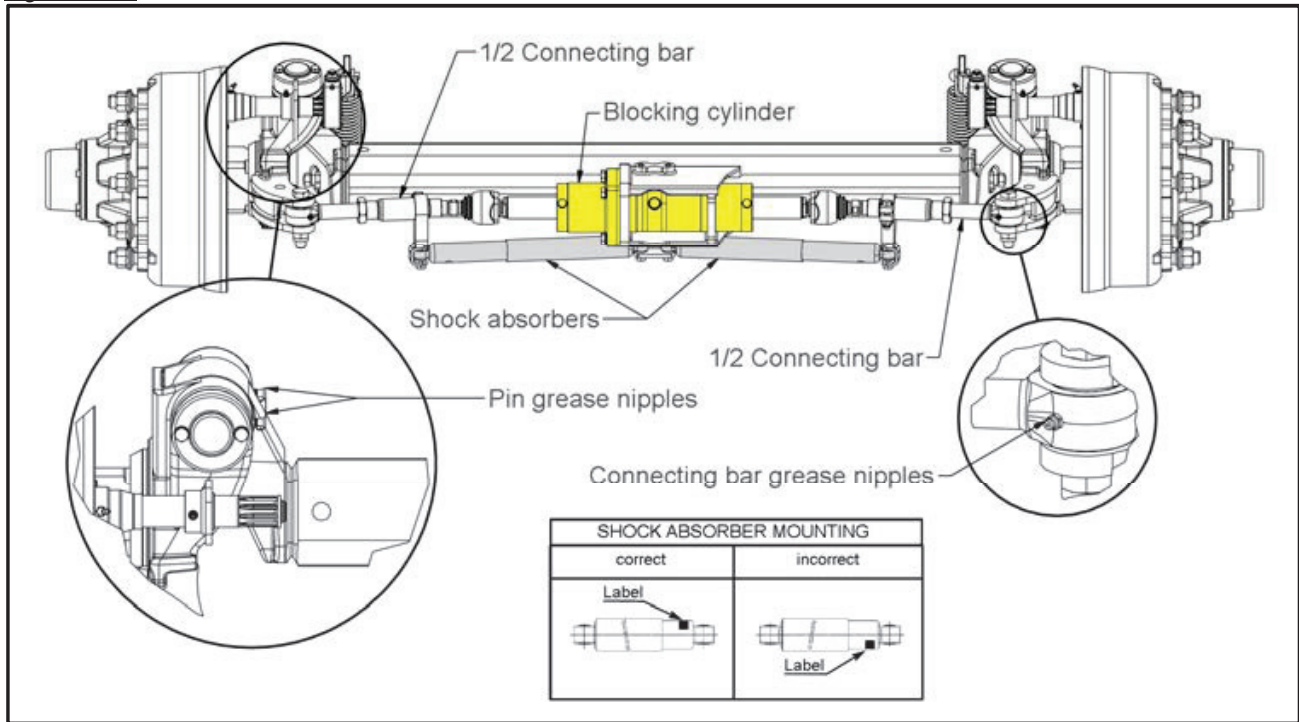
3. Steering axles



3.4 Steering axle Dual Mode

The dual mode steering axle (see [figure 3.4.1](#)) is fitted with a central hydraulic realignment and locking cylinder. It also has two shock absorbers.

Figure 3.4.1 :



3.4.1 Routine maintenance on dual mode steering axle

Follow the instructions in paragraphs 2.2 (axles, maintenance and adjustment), 2.3 (brakes, maintenance and adjustment), 3.2.4 (clearance adjustment), and 3.2.5 (steering angle adjustment) as well as the specific dual mode axle adjustments below :

Every 3 months and before each campaign : (see [figure 3.4.1](#))

- Grease the steering pivots and the connecting bar ball joints
- Check the tightness of screws and nuts and the fixings for components mounted on the steering axle (units, cylinders and their mountings, blocking cylinder, shock absorbers, Connecting bar, etc.)
- Check the tightness of the adjustment lock nut on the two 1/2 connecting bars
- Check the condition of the ball joints on the two 1/2 connecting bars, change them if necessary
- Check that the Connecting bar assembly has not been accidentally bent as this would upset the steering axle adjustment, notably the wheel alignment. (Paragraph 3.4.2. Checking and adjusting wheel alignment).
- Check the locking of the screw limiting the steering axle steering angle.
- If the steering axle becomes unstable. Check the shock absorbers; the presence of traces of oil does not signify that the shock absorber is faulty but a significant oil leak will ultimately lead to its destruction. Disconnect one end of the shock absorber and operate it by hand; if the resistance is weak, replace them. Also, replace shock absorbers that are seriously dented.
- Respect the shock absorber position on the new shock absorber : **label to the top and identification point towards the bottom** as shown in [figure 3.4.1](#)
- Investigate and repair any leaks (air or oil) on the units, cylinders and shock absorbers.

3. Steering axles

3.4.2 Checking and adjusting wheel alignment on dual mode steering axles.

Before proceeding with this adjustment, make sure that the ball joints, item 1 at the connection with the arms, and the axial ball joints, item 2, are in good condition, if necessary replace them. (See [figure 3.4.2](#))

Place the vehicle and the steering axle in line on a flat and perfectly horizontal surface.

This operation should be done with the cylinder locked for dual mode steering axles and in the central position for forced dual mode steering axles.

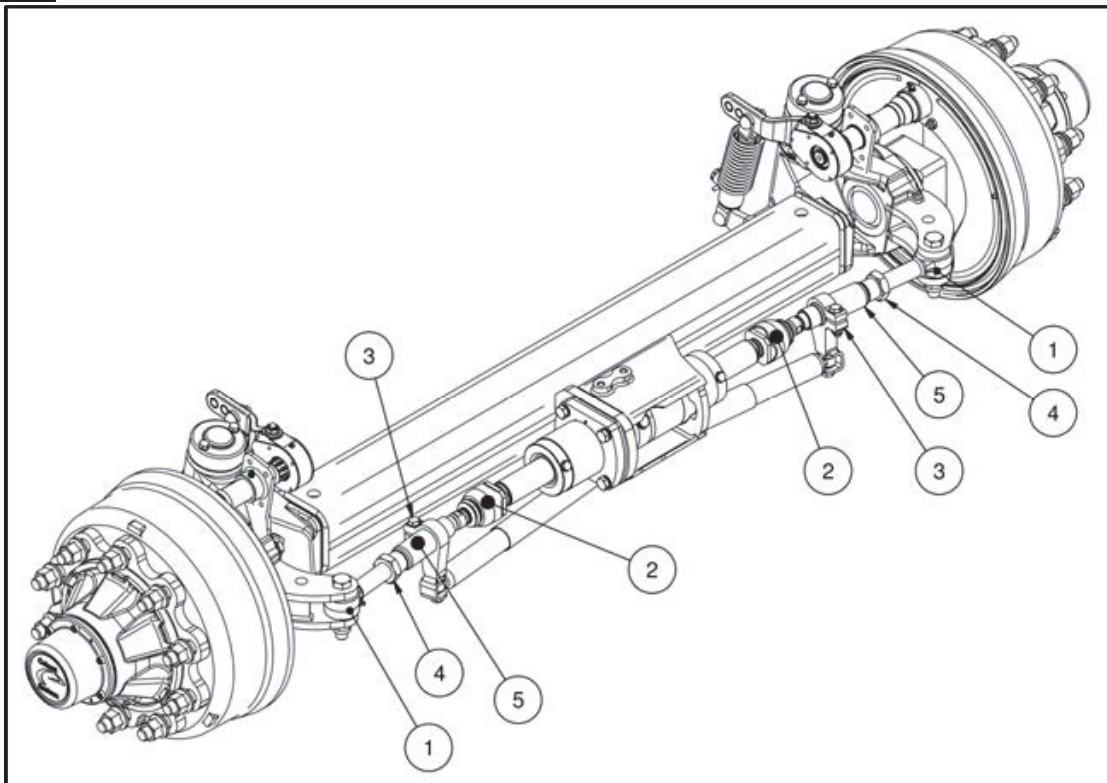
- Measure the distance between the wheel rims at the front of the steering axle, and then at the rear; you should find the same measurement.
- Move the vehicle forward to turn the wheels half a turn and check again (to eliminate the effect of wheel buckling).

If this adjustment is not correct, proceed as follows : (see [figure 3.4.2](#))

During the adjustment procedure, check the steering axle wheel alignment in relation to the wheels on the fixed axle using an inspection rule : (Care : what is important is that the wheels should be correctly aligned with each other : it is possible that the axle tracks may be slightly different without causing a wheel alignment fault).

- Loosen the 3 screws, item 3, to release the shock absorber mountings.
- Release the 2 lock nuts, item 4, on the ½ connecting bars.
- Turn the two ½ connecting bars to toe-out or toe-in the wheels until the two distances are the same. The adjustment may be set with a slight toe-in (front distance smaller than the rear distance up to approx. 4 mm, never set the front distance greater than the rear).
- Once the adjustment is obtained tighten the lock nut, item 4, on both sides.
- Tighten the screws, item 3, on the shock absorber mountings while taking care to respect the shock absorber fitting direction (see [figure 3.4.1](#)). In the neutral position of the steering axle the shock absorbers should be mounted in their rest position.

figure 3.4.2 :



3. Steering axles



3.5. Dual Mode forced steering axle

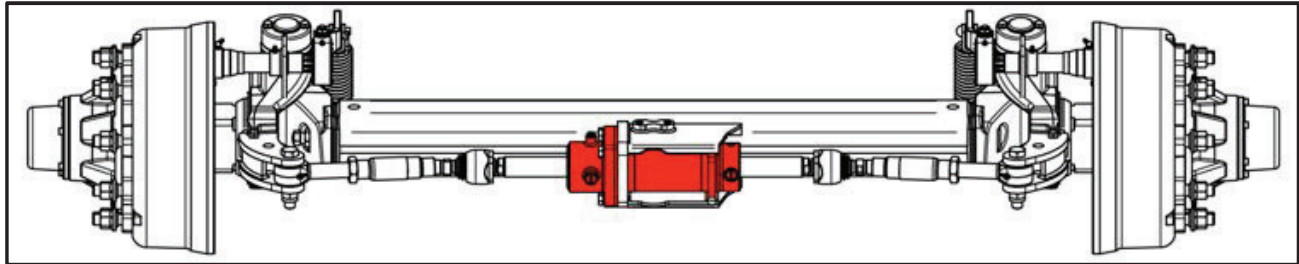
The forced Dual Mode axle (see *figure 3.5*) is fitted with a hydraulic control cylinder and no shock absorber. The design and construction of the hydraulic control for a forced Dual Mode steering axle are the responsibility of the vehicle manufacturer.

To align a forced Dual Mode steering axle, to bleed the hydraulic circuit or for any other operation on the hydraulic control consult the vehicle manufacturer's manual. The rest of the checks and/or adjustments are the same as chapters 3.2.1 (Routine maintenance) and 3.4.2 (Checking and adjusting wheel alignment).



Warning : Before doing any work on the hydraulic or pneumatic circuits where oil or air may be under pressure, take all necessary precautions.

figure 3.5 :



4. Self-steering axle

4.1 Manual self-steering axle

4.1.1 General points

(Figure 4.1.1)

The self steering axle consists of a fixed part, item 1, called the sleeve, that is fixed to the suspension and a moving part comprising several parts :

- Two sets of arms swinging in relation to two pivot points, item 3.
- One solid axle body, item 2, sliding in the sleeve.
- 2 connecting bars (one at the front, item 4, and one at the rear, item 5) which are held by hydraulic cylinders (items 6 and 7) and depend on the direction of vehicle movement.

The arms and the body form a directional assembly, connected by two connecting bars enabling forward or reverse operation of the axle, alternately and depending on the locking (front or rear). When the towed vehicle exercises a force to steer the wheels with one of the connecting bars locked, the body slides in the sleeve allowing the bars to move in the direction of movement of the vehicle.

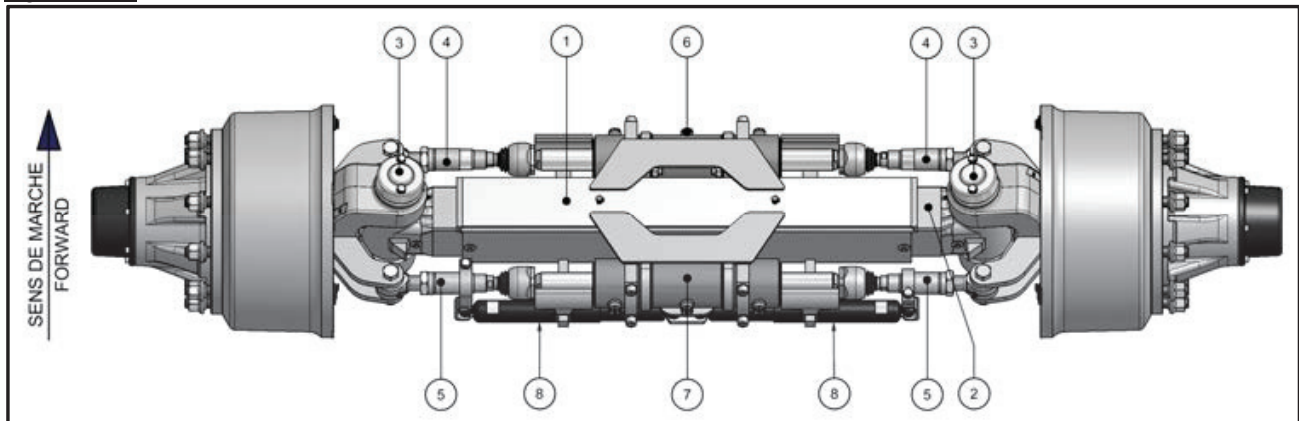
To engage forward movement :

The locking of the front cylinder(s)*, item 6, immobilises the front connecting bar, item 4, completely. The rear connecting bar, item 5, remains free, the cylinder(s)*, item 7, are not under pressure. In this configuration the self steering axle operates like a conventional steering axle. It follows the movement of the vehicle. The shock absorber(s)*, item 8, attached to the rear connecting bar and the sleeve have the effect of damping unwanted movement and stabilising the units, especially when travelling in a straight line.

To engage reverse movement :

The locking of the rear cylinder(s)*, item 7, immobilises the rear connecting bar, item 5, completely. The front connecting bar, item 4, becomes free by the release of the cylinder(s)* at the front, item 6. In this configuration the self steering axle operates in the same way as it does in forward drive. It follows the movement of the vehicle.

Figure 4.1.1 :



* Figure 4.1.1 shows the latest version of the self steering axle with two blocking cylinders in the connecting bars; the previous version was fitted with four single acting blocking cylinders, two at the front and two at the rear (see [figure 4.1.2](#) or [4.1.3.1](#)).

Important reminder : The design and construction of the hydraulic cylinder control are the responsibility of the vehicle manufacturer. For all additional information refer to the vehicle manual.

4. Self-steering axle



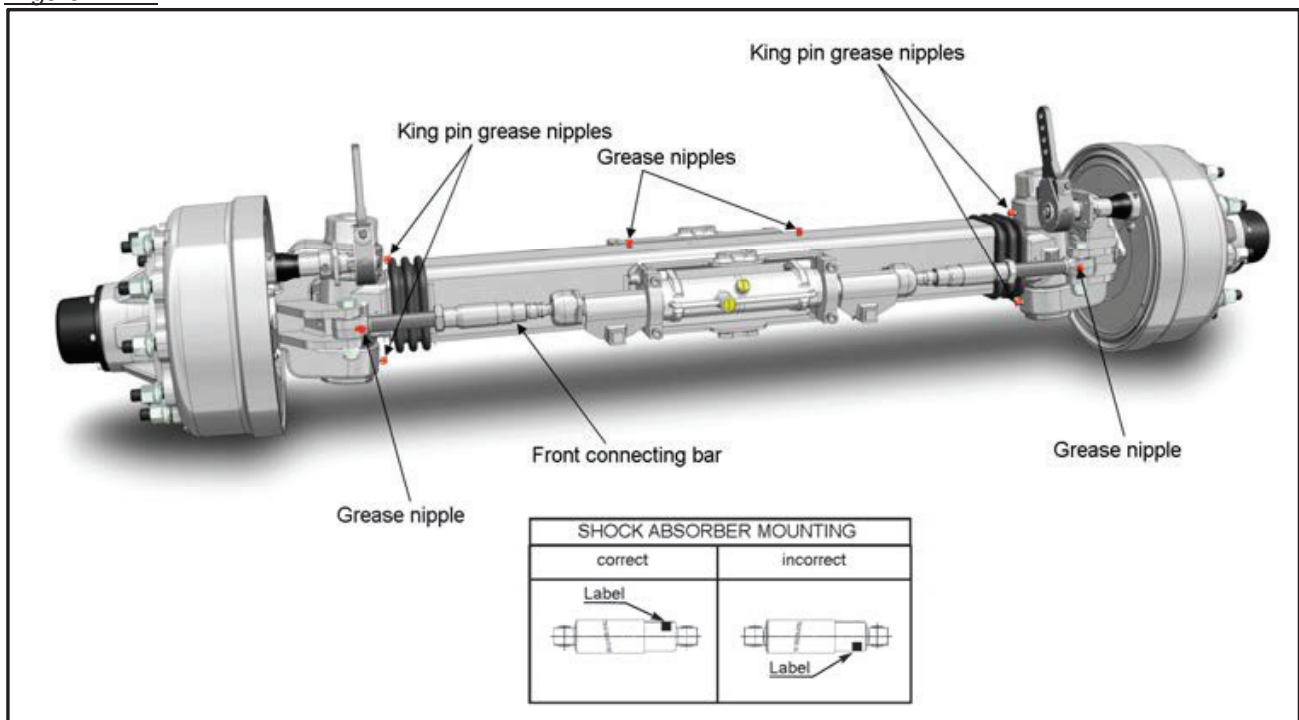
4.1.2 Routine maintenance

Follow the instructions in paragraphs 2.2 (axes, maintenance and adjustment), 2.3 (brakes, maintenance and adjustment), as well as the specific self steering axle adjustments below :

Every 3 months and before each campaign : (see [figure 4.1.2](#))

- Grease the steering pivots (4 grease nipples), the inside of the sleeve (top of the solid body, 2 grease nipples) and grease the connecting bar ball joints (2 grease nipples).
- Check the tightness of screws and nuts and the fixings for components mounted on the self steering axle (units, cylinders and their mountings, blocking cylinder, shock absorbers, Connecting bar, etc.)
- Check the tightness of the adjustment lock nut on the connecting bars and the mounting screws at each end.
- Check the condition of the ball joints on the connecting bars and the shock absorber, change them if necessary.
- Check that the connecting bar assembly has not been accidentally bent as this would upset the self steering axle adjustment, notably the wheel alignment.
- Depending on the model, check the locking of the screw limiting the self steering axle steering angle (see [Figure 4.1.4](#)).
- If the self steering axle becomes unstable. Check the shock absorbers; the presence of traces of oil does not signify that the shock absorber is faulty but a significant oil leak will ultimately lead to its destruction. Disconnect one end of the shock absorber and operate it by hand; if the resistance is weak, replace them. Also, replace shock absorbers that are seriously dented.
- Respect the position of shock absorbers on the new shock absorber. Example of fitting with the label to the top as shown in [figure 4.1.2](#).
- If the self steering axle does not steer correctly, check, on the previous versions (4 blocking cylinders) that the cylinder buffers contact the connecting bar properly [Figure 4.3](#). Check also that the cylinders remain under pressure until the following change in driving direction. (If you observe that there is an internal leak in the circuit contact the vehicle manufacturer for the repair).
- Investigate and repair any leaks (air or oil) on the units, cylinders and shock absorbers.
- Check the tapered Steering pivots for clearance. See paragraph 4.1.5.

[Figure 4.1.2](#) :



4. Self-steering axle



Warning : Before doing any work on the hydraulic or pneumatic circuits where oil or air may be under pressure, take all necessary precautions.

4.1.3 Checking and adjusting wheel alignment.

- Self steering axle with 4 blocking cylinders (see [figure 4.1.3.1](#))

Before proceeding with this adjustment make sure that the points in paragraph 4.1.2 (Routine maintenance) have been checked.

Place the vehicle and the self steering axle in line on a flat and perfectly horizontal surface. This operation should be done with all the blocking cylinders extended (axle locked position).

- Measure the distance between the wheel rims at the front of the self steering axle, and then at the rear; you should find the same measurement.
- Move the vehicle forward to turn the wheels half a turn and check again (to eliminate the effect of wheel buckling).

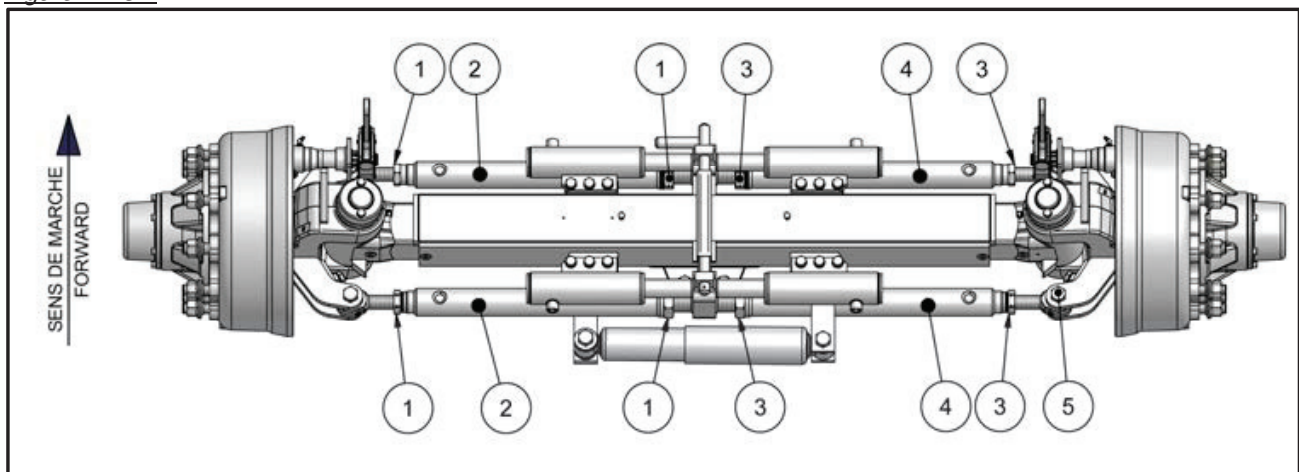
If this adjustment is not correct, proceed as follows : (see [figure 4.1.3.1](#))

During the adjustment procedure, check the self steering axle wheel alignment in relation to the wheels on the fixed axle using an inspection rule : (Care : what is important is that the wheels should be correctly aligned with each other : it is possible that the axle tracks may be slightly different without causing a wheel alignment fault).

With the blocking cylinders under pressure all the time.

- On the right side release the 4 lock nuts, item 3, on the front and rear $\frac{1}{2}$ connecting bars, item 3.
- Turn the $\frac{1}{2}$ connecting bars, item 4, to toe-out or toe-in the wheels until the two distances are the same. The adjustment may be set with a slight toe-in (front distance smaller than the rear distance up to approx. 3 mm, never set the front distance greater than the rear).
- If the shock absorber prevents the rear connecting bar, item 4, being turned remove the fixing bolt item 5, make the adjustment with the front bar and then turn the ball joint end of the rear bar until the holes line up to insert the bolt, item 5.
- Once the adjustment is obtained tighten the lock nuts, item 3.
- Make the same adjustment on the left side with the front and rear connecting bars, item 2, and the lock nuts, item 1.

Figure 4.1.3.1 :



4. Self-steering axle



- Self steering axle with 2 blocking cylinders (see [figure 4.1.3.2](#))

Before proceeding with this adjustment, make sure that the points in paragraph 4.1.2 (Routine maintenance) have been checked and check that ball joints, item 7, at the connection to the bars and the axial ball joints, item 6, are in good condition; replace them if necessary.

Place the vehicle and the self steering axle in line on a flat and perfectly horizontal surface. This operation should be done with all the blocking cylinders extended (axle locked position).

- Measure the distance between the wheel rims at the front of the self steering axle, and then at the rear; you should find the same measurement.
- Move the vehicle forward to turn the wheels half a turn and check again (to eliminate the effect of wheel buckling).

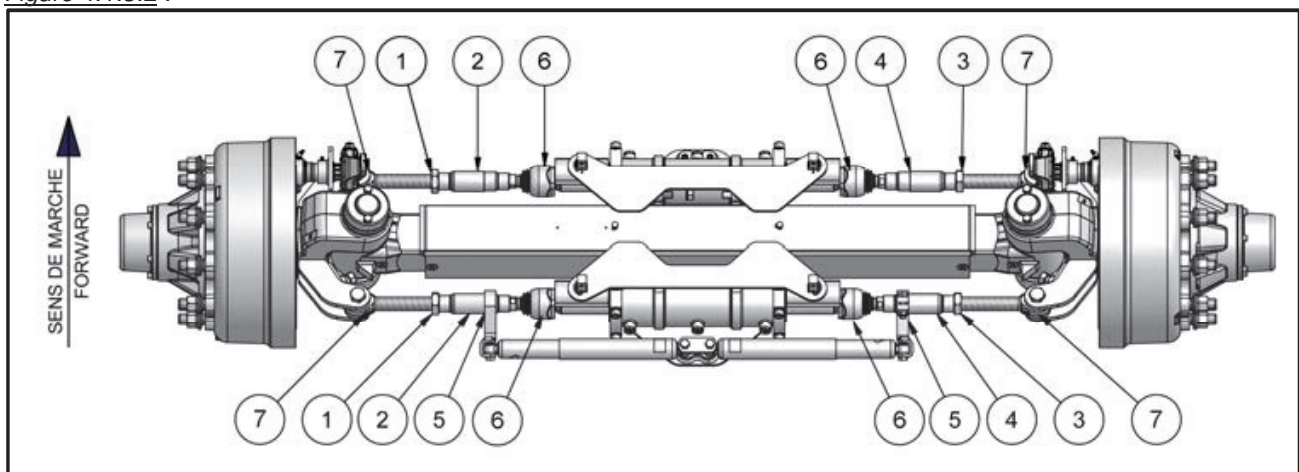
If this adjustment is not correct, proceed as follows : (see [figure 4.1.3.2](#))

During the adjustment procedure, check the self steering axle wheel alignment in relation to the wheels on the fixed axle using an inspection rule : (Care : what is important is that the wheels should be correctly aligned with each other : it is possible that the axle tracks may be slightly different without causing a wheel alignment fault).

With the blocking cylinders under pressure all the time.

- On the right side release the 2 lock nuts, item 3, on the front and rear $\frac{1}{2}$ connecting bars, item 4.
- Turn the $\frac{1}{2}$ connecting bars, item 4, to toe-out or toe-in the wheels until the two distances are the same. The adjustment may be set with a slight toe-in (front distance smaller than the rear distance up to approx. 3 mm, never set the front distance greater than the rear).
- If the shock absorber prevents the rear connecting bar, item 4, being turned loosen the fixing bolt item 5.
- Once the adjustment is obtained lock the lock nuts, item 3.
- Make the same adjustment on the left side with the front and rear connecting bars, item 2, and the lock nuts, item 1.

Figure 4.1.3.2 :



4. Self-steering axle

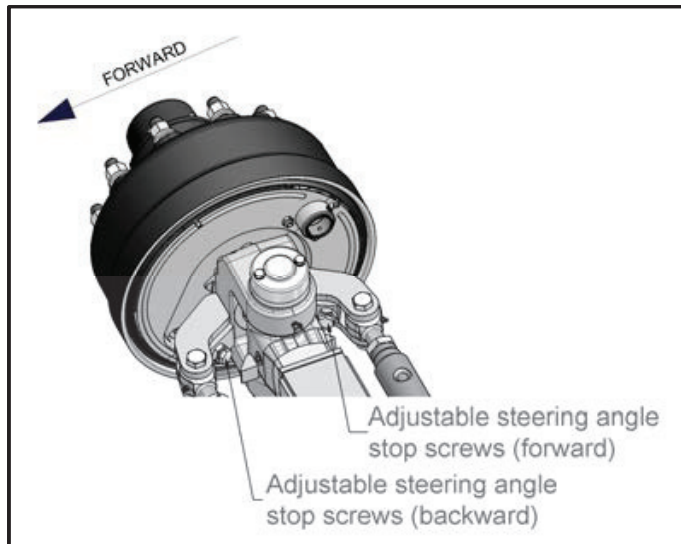
4.1.4 Adjusting the steering angles

To limit the turning circle of self steering axles when very wide tyres are fitted, adjust the adjustable steering angle stop screws.

Check this adjustment periodically, in the configuration where the self steering axle is turned to its maximum to the right and then to the left, in the forward and reverse driving positions. It is important to make sure that the tyres do not come into contact with the chassis or the suspension to prevent risks of wear or damage to the tyres and/or the vehicle.

Make sure that the steering angle stops are firmly tightened. (see [figure 4.1.4](#))

Figure 4.1.4 :



4. Self-steering axle

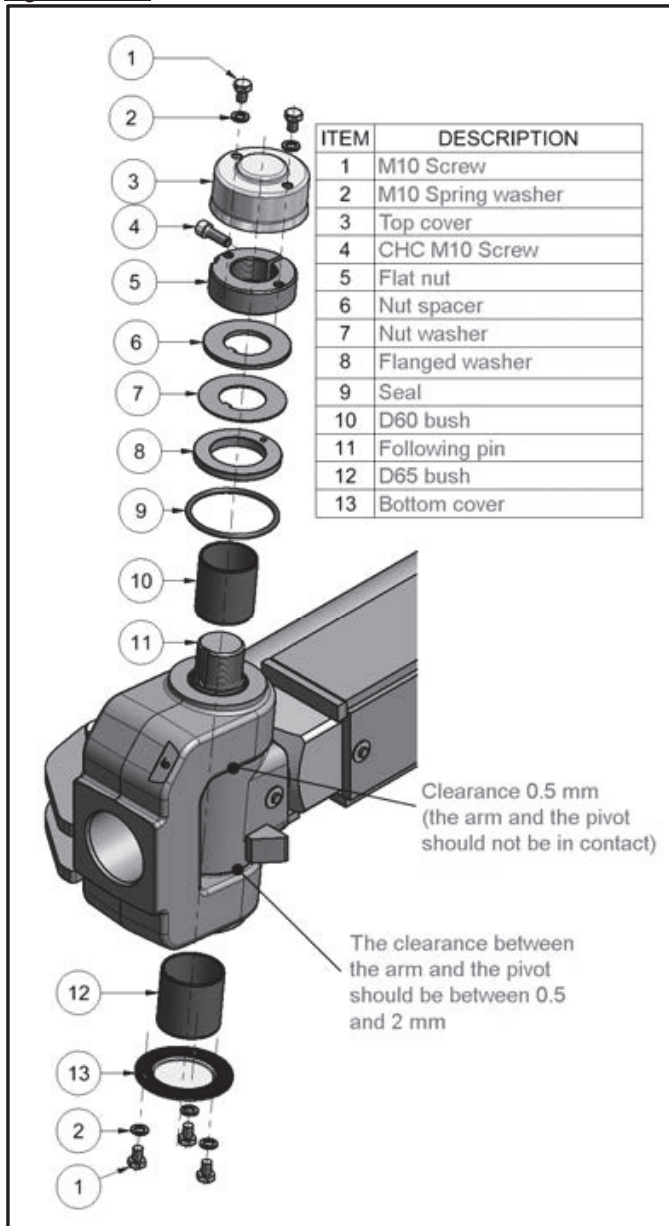


4.1.5 Clearance adjustment

This procedure is only valid for self steering axles with tapered Steering pivots, recognisable by a pressed steel cover (item 3 on [figure 4.1.4](#))

Every year and before each campaign, check and adjust the clearance if necessary. It should be between 0.5 and 2 mm according to figure 4.1.5 (adjust the clearance to an acceptable value before it becomes less than 0.5 mm).

Figure 4.1.5 :



- To achieve this remove the 2 screws and washers, items 1 and 2, and then the cover, item 3.

- Unscrew the locking screw, item 4, of the adjusting nut, item 5.

- Adjust the clearance by turning the adjusting nut, item 5.

- Lock the screw, item 4, and refit the cover, item 3.

4. Self-steering axle

4.2 Automatic self steering axle

4.2.1 General points on the automatic self steering axle

The self steering axle consists of a fixed part, item 1, called the sleeve that is fixed to the suspension and a moving part comprising several parts : (see [figure 4.2.1](#))

- Two sets of arms swinging in relation to two pivot points, item 3.
- One solid axle body, item 2, sliding in the sleeve.
- 2 connecting bars (one at the front, item 4, and one at the rear, item 5) which are held by hydraulic cylinders (items 6 and 7) and depend on the direction of vehicle movement.

The arms and the body form a directional assembly, connected by two connecting bars enabling forward or reverse operation of the axle, alternately and depending on the locking (front or rear). When the towed vehicle exercises a force to steer the wheels with one of the connecting bars locked, the body slides in the sleeve allowing the bars to move in the direction of movement of the vehicle.

Operation when driving forward

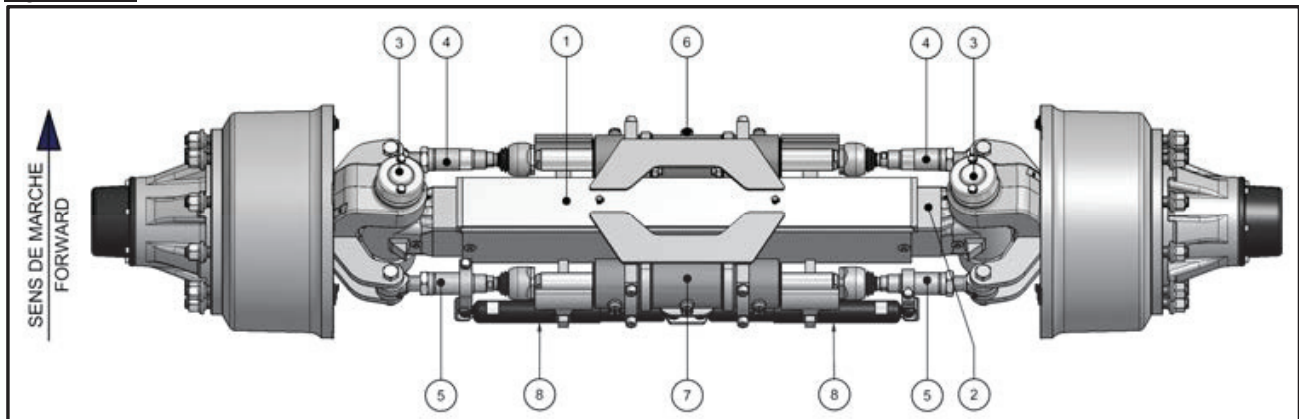
The sensor on the fixed axle detects the direction of driving and informs the ECU that the vehicle is moving forward. This information enables, the locking cylinder(s)*, item 6, to be pressurised via the solenoid valves, and to totally immobilise the front connecting bar item 4. The rear connecting bar, item 5, remains free (the cylinder(s) are not pressurised). In this configuration the self steering axle operates like a conventional steering axle. It follows the movement of the vehicle. The shock absorber(s)*, item 8, attached to the rear connecting bar and the sleeve have the effect of damping unwanted movement and stabilising the units, especially when travelling in a straight line.

Operation when driving in reverse

When the direction of travel is reversed the sensor immediately informs the ECU. The front cylinder(s), item 6, are released (the front connecting bar, item 4, is completely free) and the rear cylinder(s), item 7, are pressurised to immobilise the rear connecting bar, item 5. In this configuration the automatic self steering axle operates in the same way as it does in forward drive. It follows the movement of the vehicle.

On significant sideways slopes or if wheel adhesion is low, it is possible to lock the automatic self steering axle by placing the switch on the ECU in the "manual lock" position. In this position the front and rear connecting bars, items 4 and 5, are completely locked fixing the self steering axle.

Figure 4.2.1 :



* [Figure 4.2.1](#) shows the latest version of the self steering axle with two locking cylinders in the connecting bars; the previous version was fitted with four single acting locking cylinders, two at the front and two at the rear (see [figure 4.1.2](#) or [4.1.3.1](#)).

4. Self-steering axle



4.2.1 Automatic self steering axle maintenance

Follow the instructions in paragraphs 2.2 (axles, maintenance and adjustment), 2.3 (brakes, maintenance and adjustment). The other procedures for checking and/or adjustment and routine maintenance of automatic self steering axles (paragraph 4.1.2), wheel alignment (paragraph 4.1.3), steering angles (paragraph 4.1.4) and clearance adjustment (paragraph 4.1.5) are identical to those of the manual self steering axle. Refer to these paragraphs.

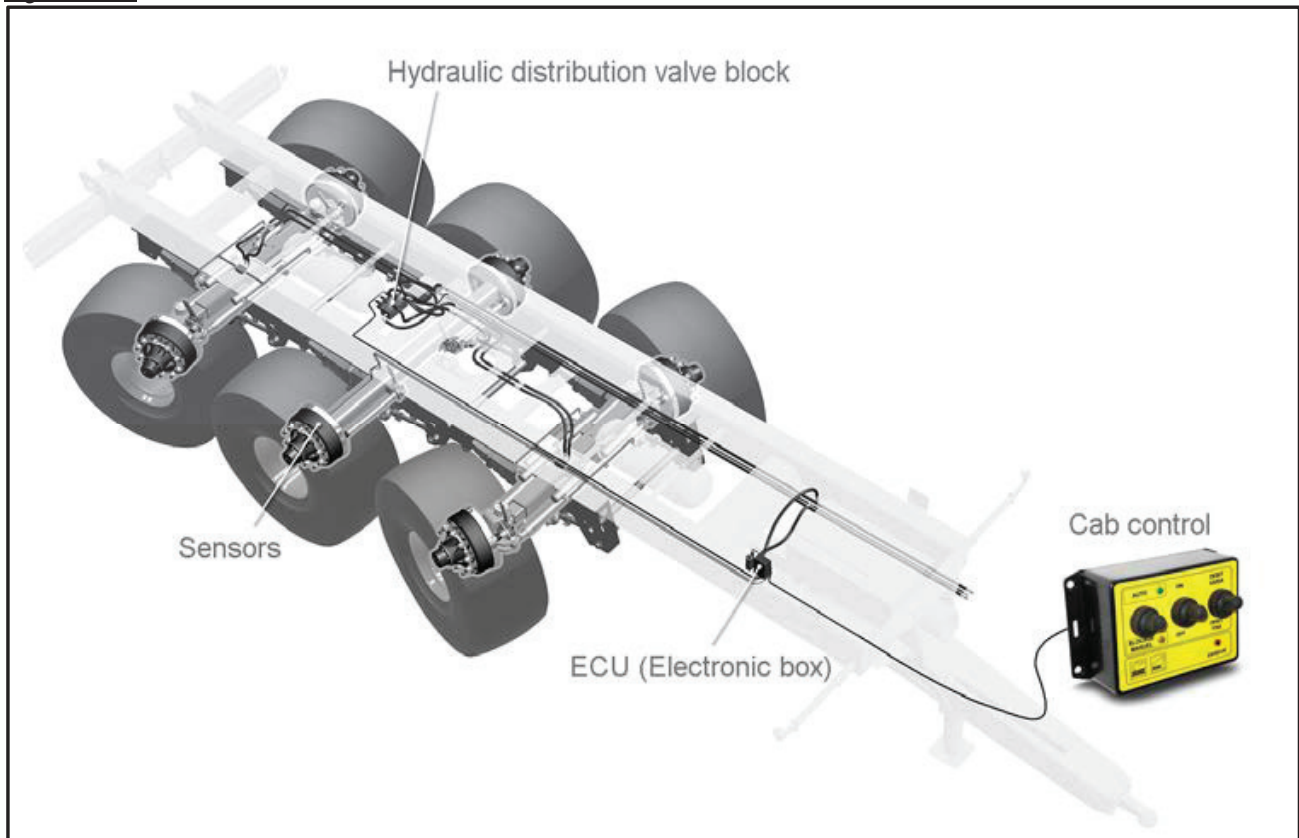
In addition, for automatic self steering axles it is necessary to do the following :

- Check regularly that all components are properly protected against water and impacts. (Distributor valve block and ECU, see *figure 4.2.1*).
- Check for damage or risk of foul conditions of harnesses in sensitive areas (especially between the tractor and the vehicle and close to sensor connectors).
- Check the connection of the main electrical power supply enabling the system to be fed properly.



During high pressure cleaning of the vehicle take care not to spray the control components directly. The locking cylinder control systems and/or the positioning of various hydraulic and electric components may vary according to the make of vehicle; refer to the manufacturer's manual.

Figure 4.2.1 :



5. Bogies suspensions

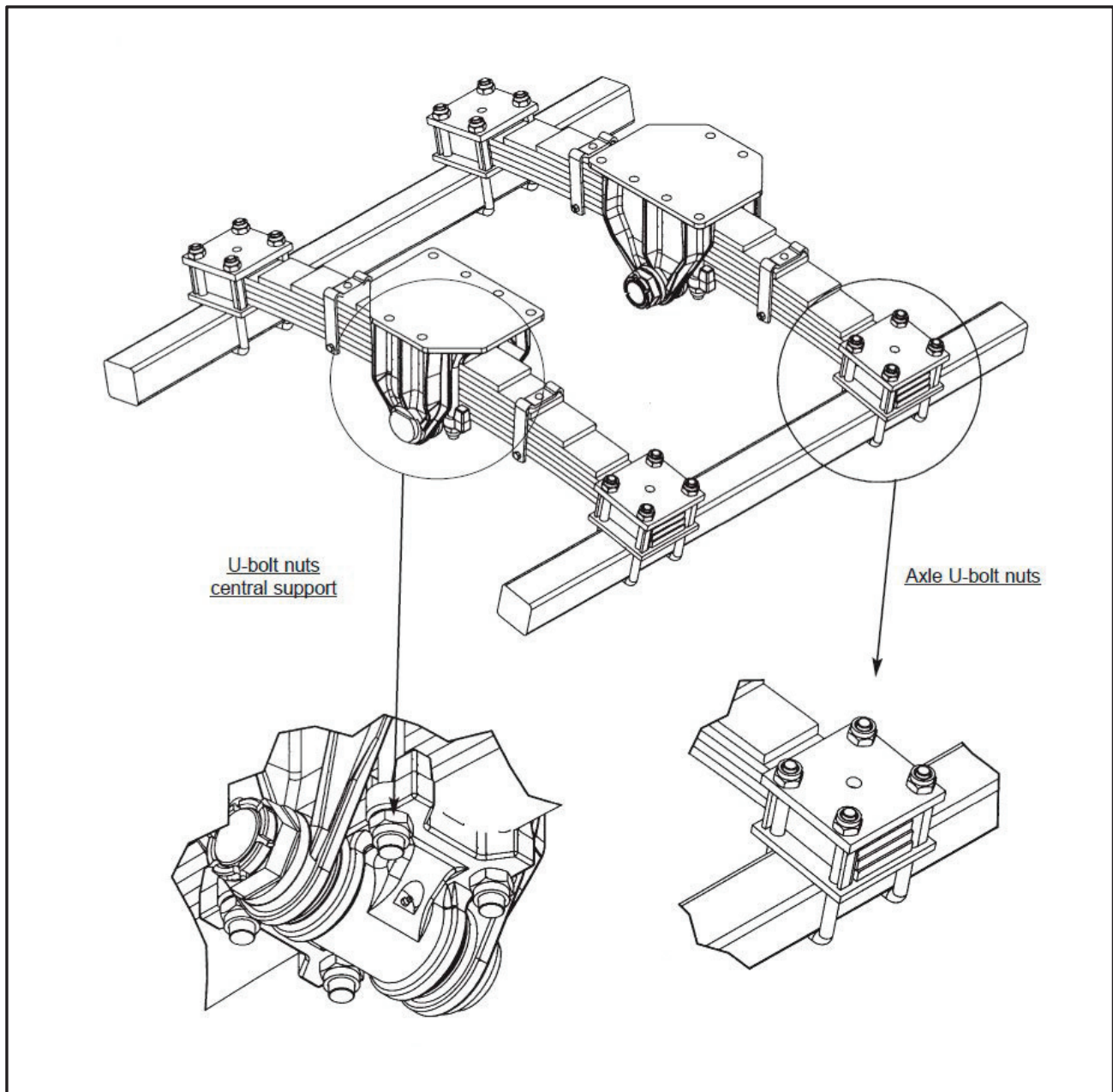
5.1 Bogie with U-bolt clamps of central support

figure 5.1.a

After the first laden journey, before intensive use or every 6 months :

- Tighten all the U-bolt nuts (centre and axle U-bolts) to the recommended torque.
- Tighten the nuts diagonally (see chapter 10).
- If the suspension is bolted to the chassis, tighten the bolts.
- Lubricate the central articulation.

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



5. Bogies suspensions

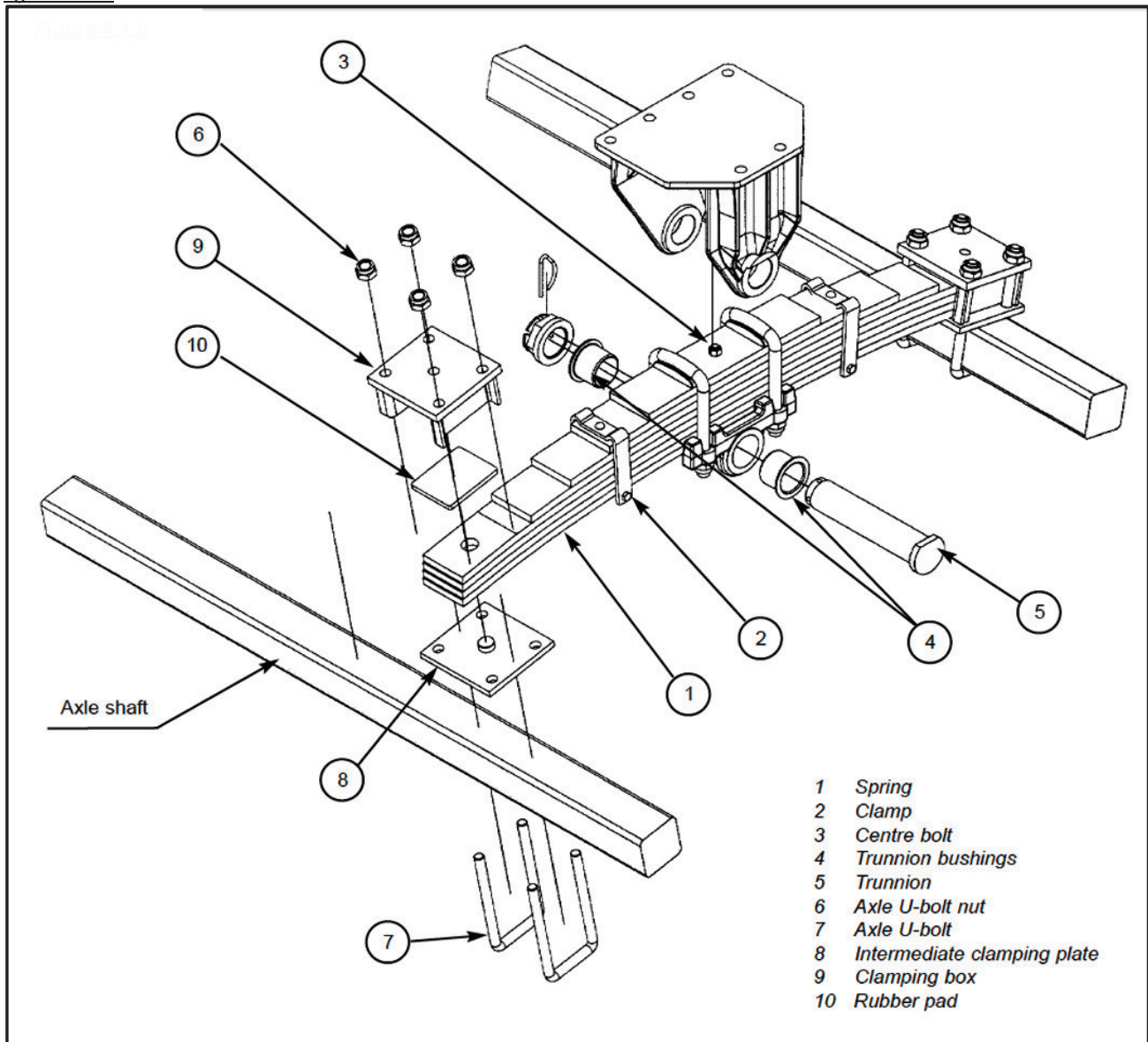


Every year :

- Check the clearance between the bushings and the trunnions and, if there is excessive clearance, replace the worn parts.
- Check the general condition of the springs : clean them thoroughly and brush the sides of the springs to check for cracks.
- If there is any clearance between the spring and the axle, check the whole of the clamping system (See [figure 5.1.b](#)) : the rubber pad, the clamping box and plate and the alignment pin.

Reassemble, tightening the U-bolt nuts diagonally to the recommended torque (see [chapter 10](#)) .

figure 5.1.b



5. Bogies suspensions

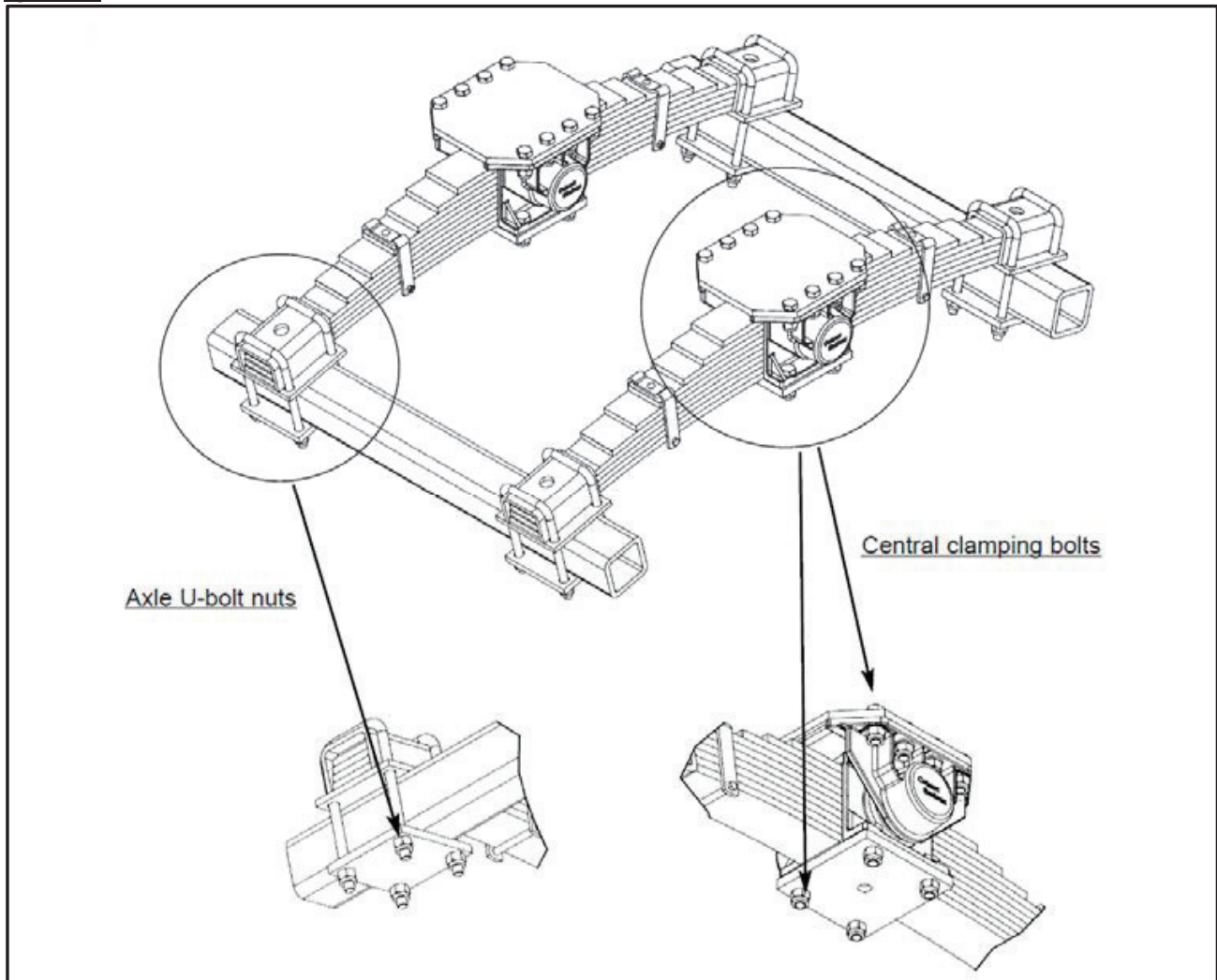
5.2 Bogie with central support box

After the first laden journey, before intensive use or every 6 months : (*figure 5.2*)

- Tighten all the centre clamping bolts and axle U-bolts to the recommended torque. Tighten the nuts diagonally (*see chapter 10*).
- Lubricate the central bearings

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

figure 5.2



Every year :

- Check the clearance in the centre bearings and, if there is excessive clearance, replace the worn parts.
- Check the general condition of the springs : clean them thoroughly and brush the sides of the springs to check for cracks.
- If there is any clearance between the spring and the axle, check the whole of the clamping system (See *figure 5.1.b*) : the rubber pad, the clamping box and plate and the alignment pin.

Reassemble, tightening the U-bolt nuts diagonally to the recommended torque (*see chapter 10*).

6. Basic tandem suspension and basic half-tandem suspension



After the first laden journey, before intensive use or every 6 months (See *Figure 6.1*) :

- Tighten all the centre clamping bolts and axle U-bolts to the recommended torque. Tighten the nuts diagonally (See *chapter 10*).
- Retighten all the nuts and screws on the suspension (spring shackles, rocker, equaliser bearings, spring bolts, springs)
- Lubricate the rocker bearings and the spring bolts.

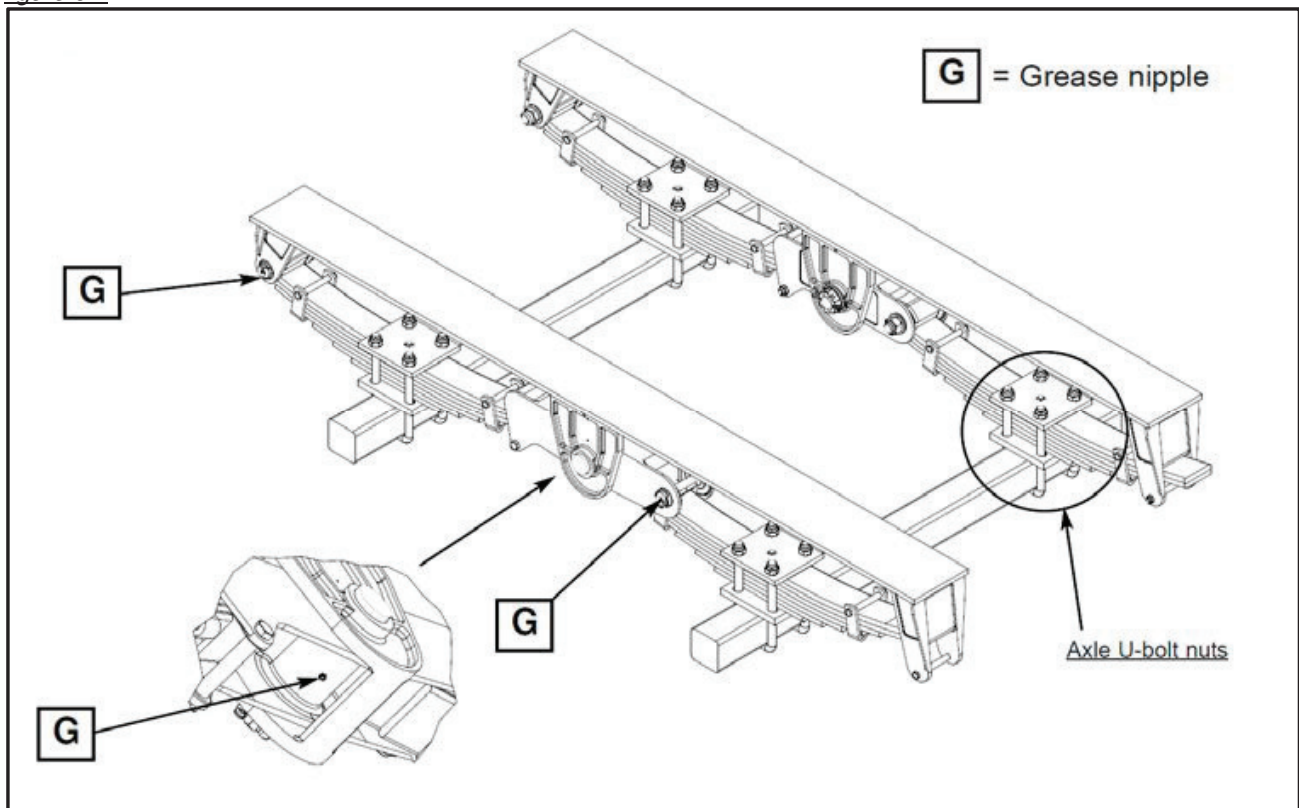
Under harsh or intensive operating conditions, maintenance should be carried out more frequently.

Every year (See *Figure 6.2*) :

- Check the clearance between the bushings Item 2 and the rocker shafts Item 1 and, if there is excessive clearance, replace the worn parts.
- Check the rocker Item 3 and the spring shackles Item 4 for wear (spring bearing surface) and replace these parts if they are very worn.
- Check the general condition of the springs Item 5, clean them thoroughly and brush the sides of the springs to check for cracks.
- If there is any clearance between the springs and the axles, check the whole of the clamping system : clamping plates Item 8, spring alignment Item 9, brides Item 10.

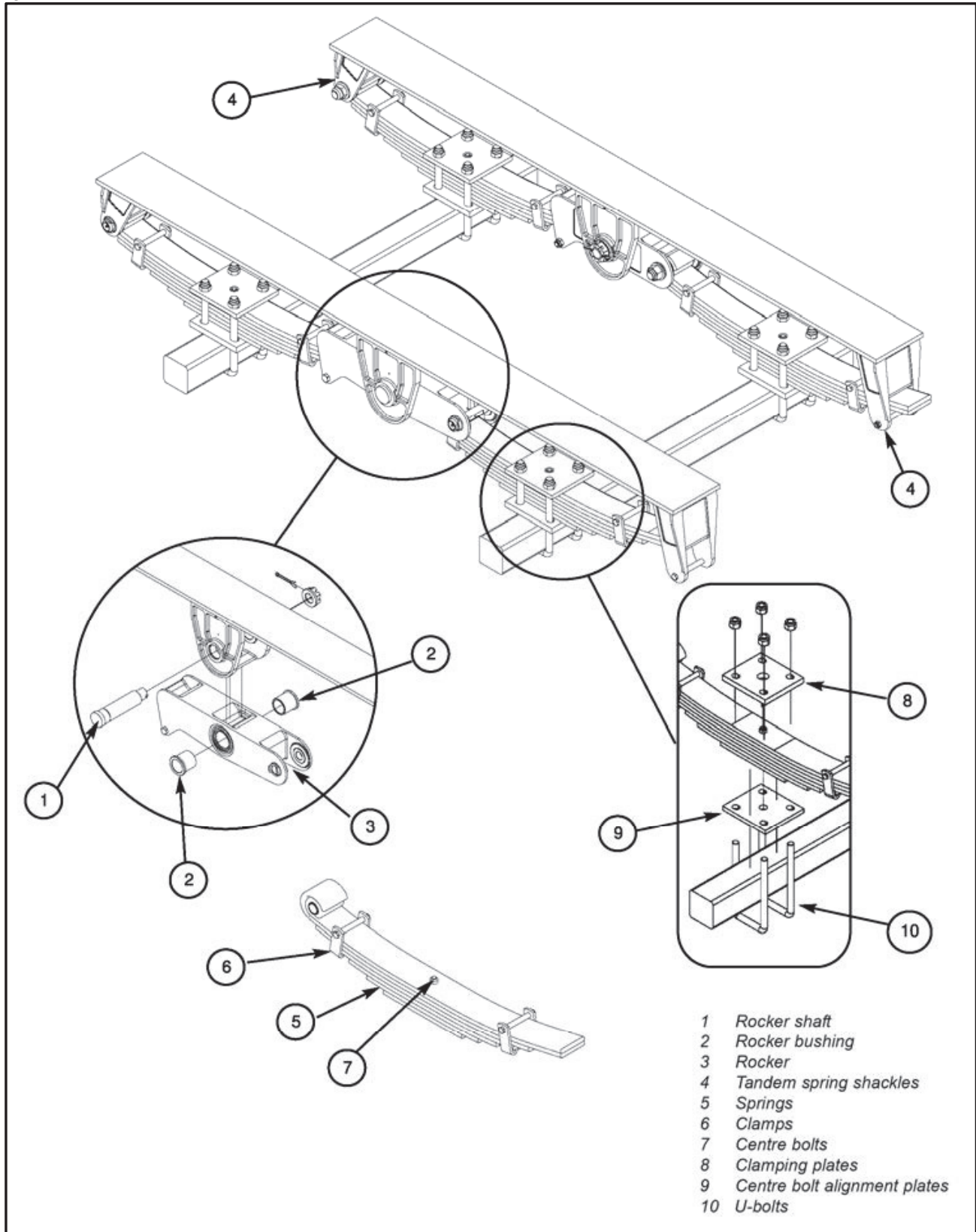
Maintenance of half-tandem suspensions without rocker bars is the same as for simple tandem suspensions with rocker.

figure 6.1



6. Basic tandem suspension and basic half-tandem suspension

figure 6.2



7. Half-tandem, tandem and tridem suspension with rods



After the first laden journey, before intensive use or every 6 months (See *figure 7.a*) :

- Tighten all the axle U-bolt nuts to the recommended torque. Tighten the nuts diagonally (See *chapter 10*).
- Retighten all the nuts and screws on the suspension (spring shackles, rocker, fixed and adjustable trailing arms, springs).
- Retighten the adjustable trailing arms (See *figure 7.b*) : if the bolts were loose, the length of the trailing arms may be incorrect. Check that the axles are correctly aligned after tightening (central section with left and right-hand threads).
- Retighten the fixed and adjustable trailing arm flexible bushing mountings :



NB : The clamping washers Item 1 should not touch the bracket Item 2. If they do, the conical rubber bushings should be replaced Item 3 (See *figure 7.c*).

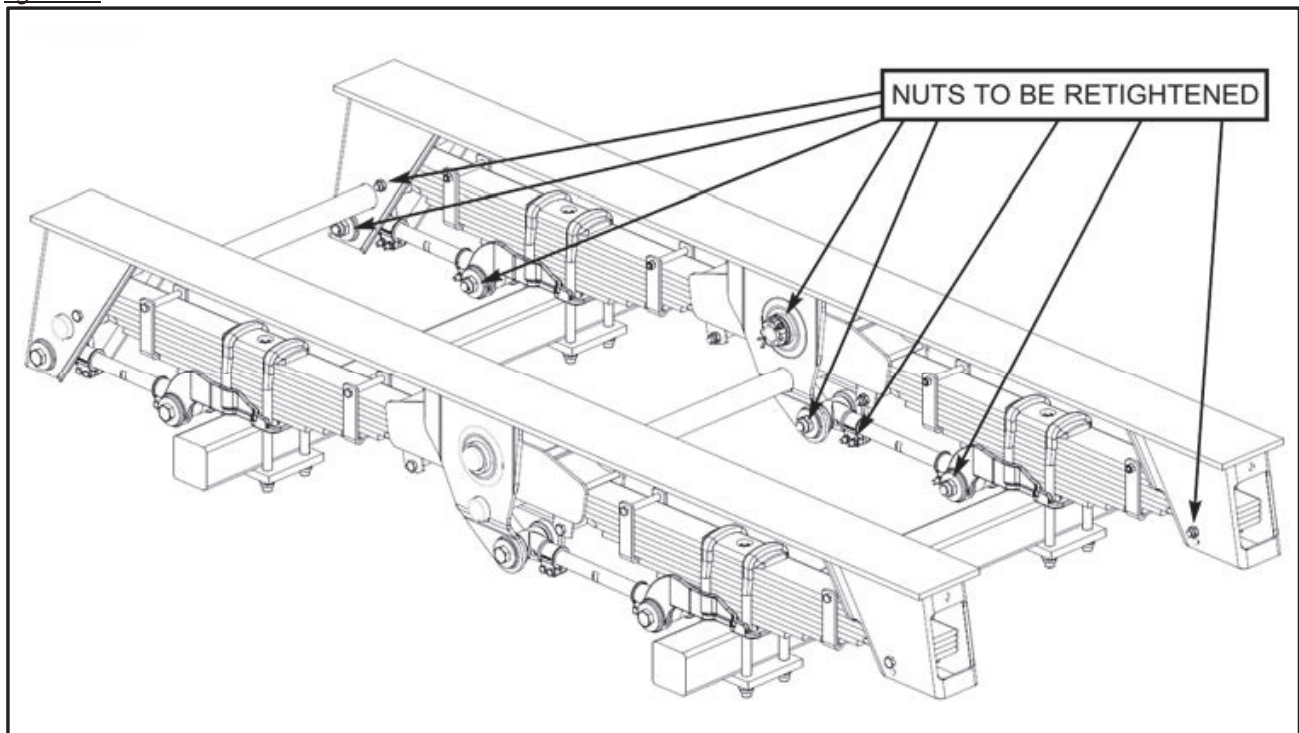
- Check the condition of the clamping bolts.
- Lubricate the rocker shafts.

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

Every year : (See *figure 7.d*)

- Check the clearance between the bushings Item 1 and the rocker shaft Item 2, and, if there is excessive clearance, replace the worn parts. Check the rocker Item 3 and the spring shackles Item 4 for wear (spring bearing surface) and replace these parts if they are very worn.
- Check the general condition of the springs Item 5, clean them thoroughly and brush the sides of the springs to check for cracks.
- If there is any clearance between the springs Item 5 and the axles, check the whole of the clamping system : clamping plates Item 8, spring bolt alignment plate Item 9, U-bolts Item 10.

figure 7a



7. Half-tandem, tandem and tridem suspension with rods

figure 7.b

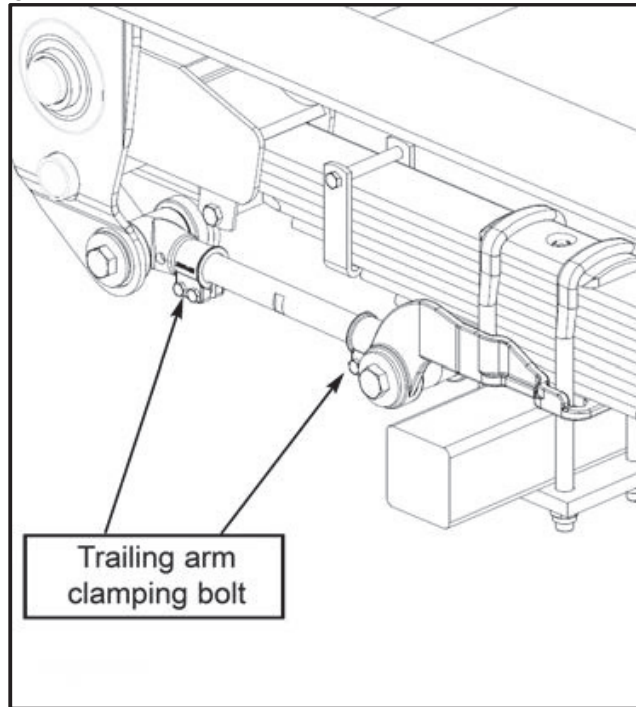


figure 7.c

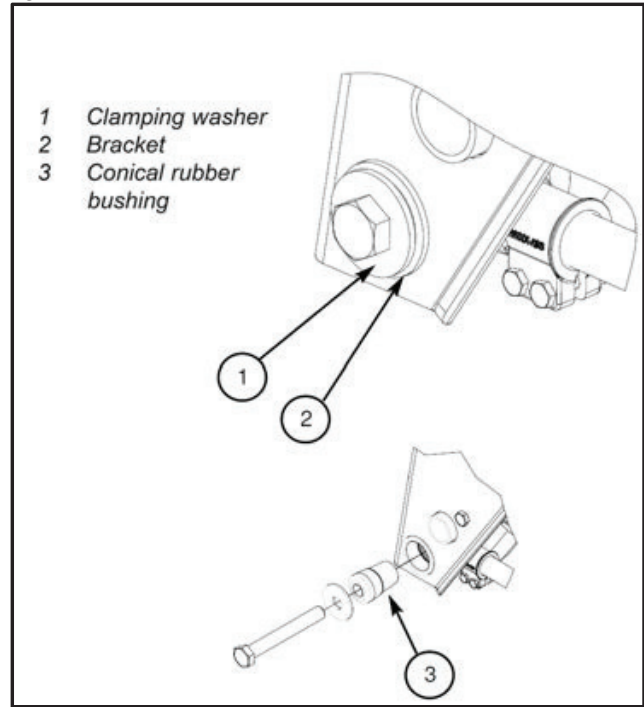
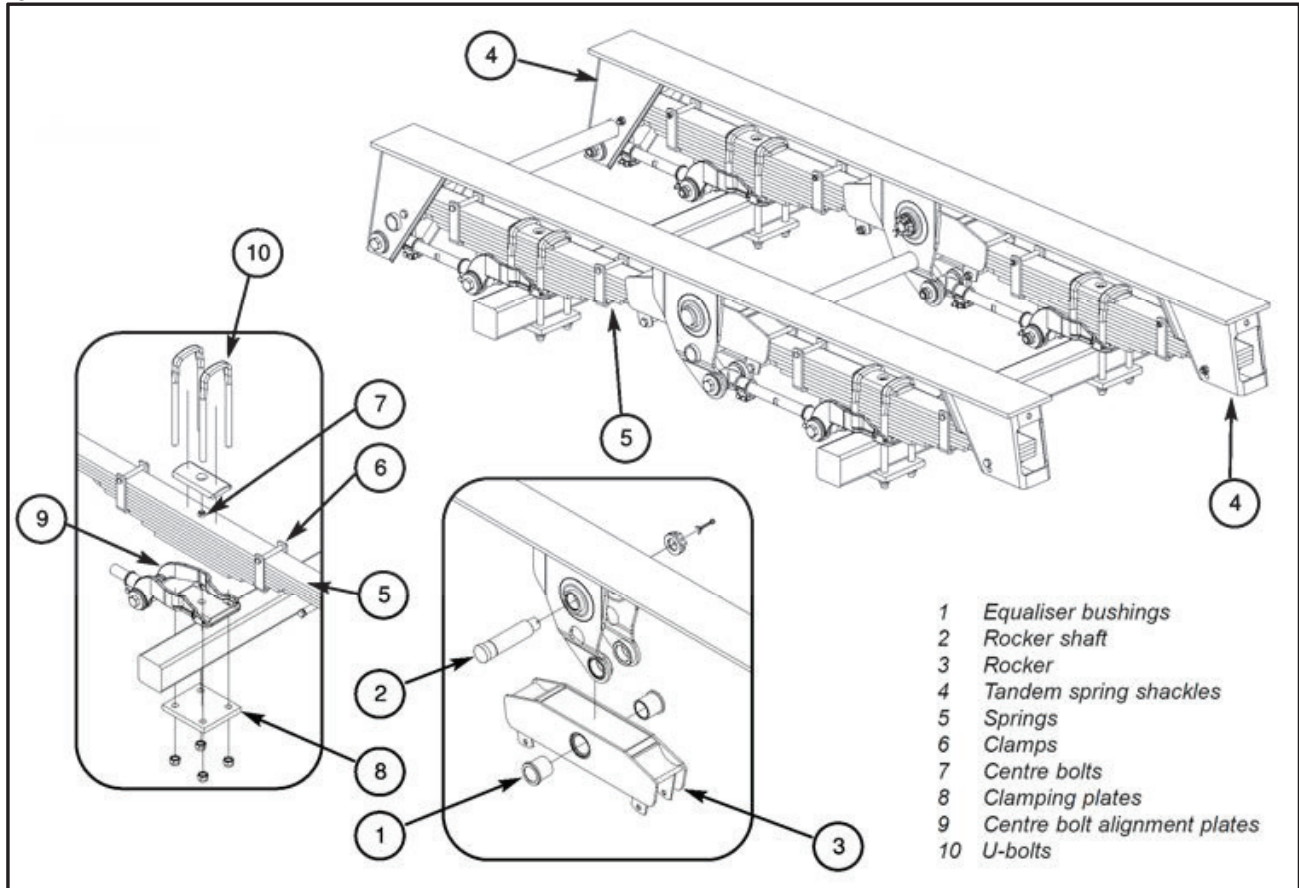


figure 7.d



8. Hydraulics suspensions



After the first journey under load, before each campaign or every 6 months or 25000 km :

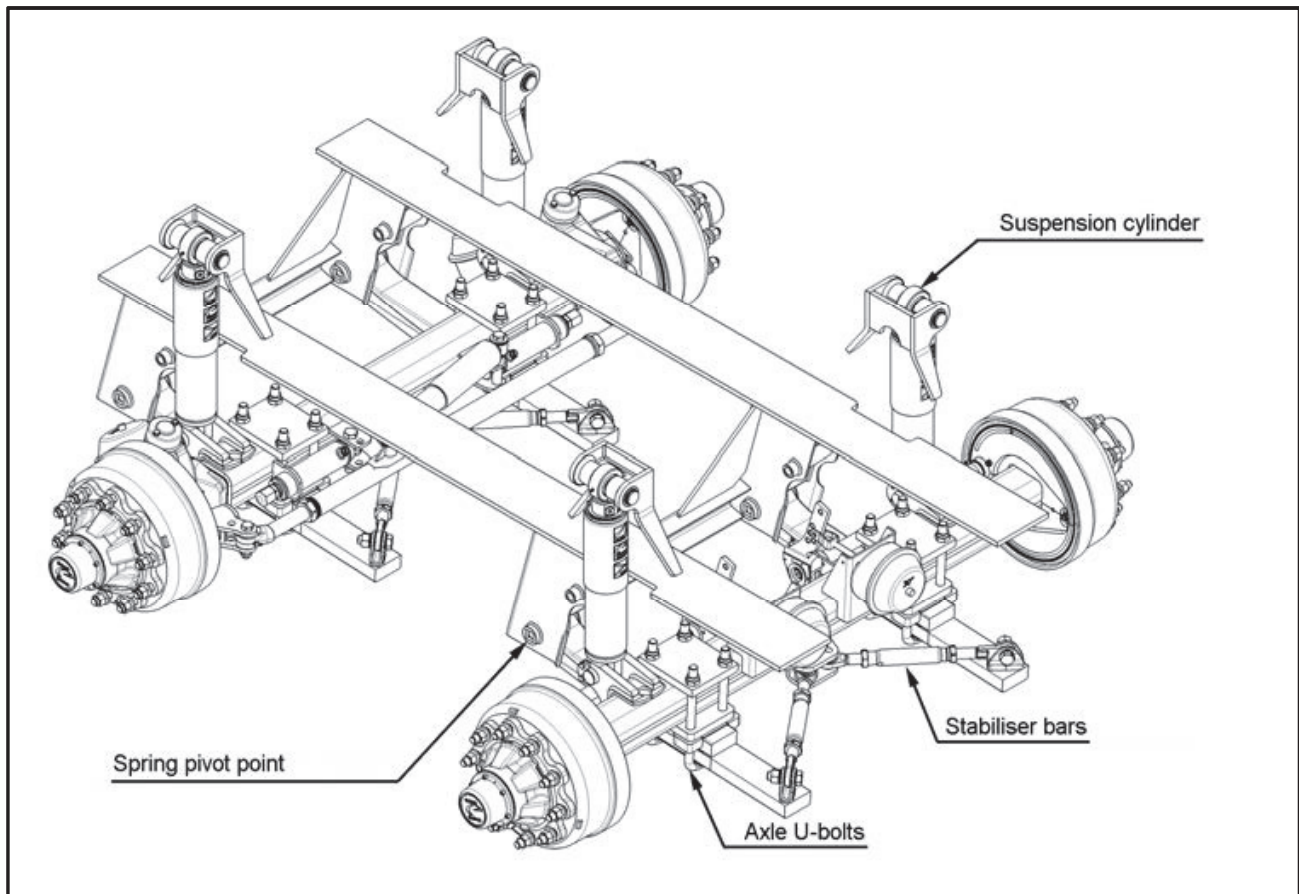
- Check and torque all the nuts on axle U-bolts. Use a diagonal tightening sequence (see chapter 10).
- Check the tightness of all bolts, screws and nuts on the suspension; check especially that the spring articulation silent blocs are properly tightened.
- Check that the hydraulic suspension cylinders have no external impacts or traces of wear. In the event of a problem correct it and replace any faulty parts.
- Check for and repair any oil leaks.
- Check for and replace faulty spring silent blocs. In the event of wear large clearance is observed when moving the vehicle forwards and backwards successively with the axle held by the parking brake or chocks.
- Check that suspension stabiliser bars are in good condition (tightness of nuts, condition of ball joints), if necessary replace faulty parts.

For difficult or intensive working conditions, increase the frequency of these operations.

For adjustment and maintenance of the hydraulic suspension control system, contact the vehicle manufacturer.



Warning : Before doing any work on the hydraulic or pneumatic circuits where oil or air may be under pressure, take all necessary precautions.



9. Air suspension

After the first laden journey, before intensive use, every 6 months or 25,000km :

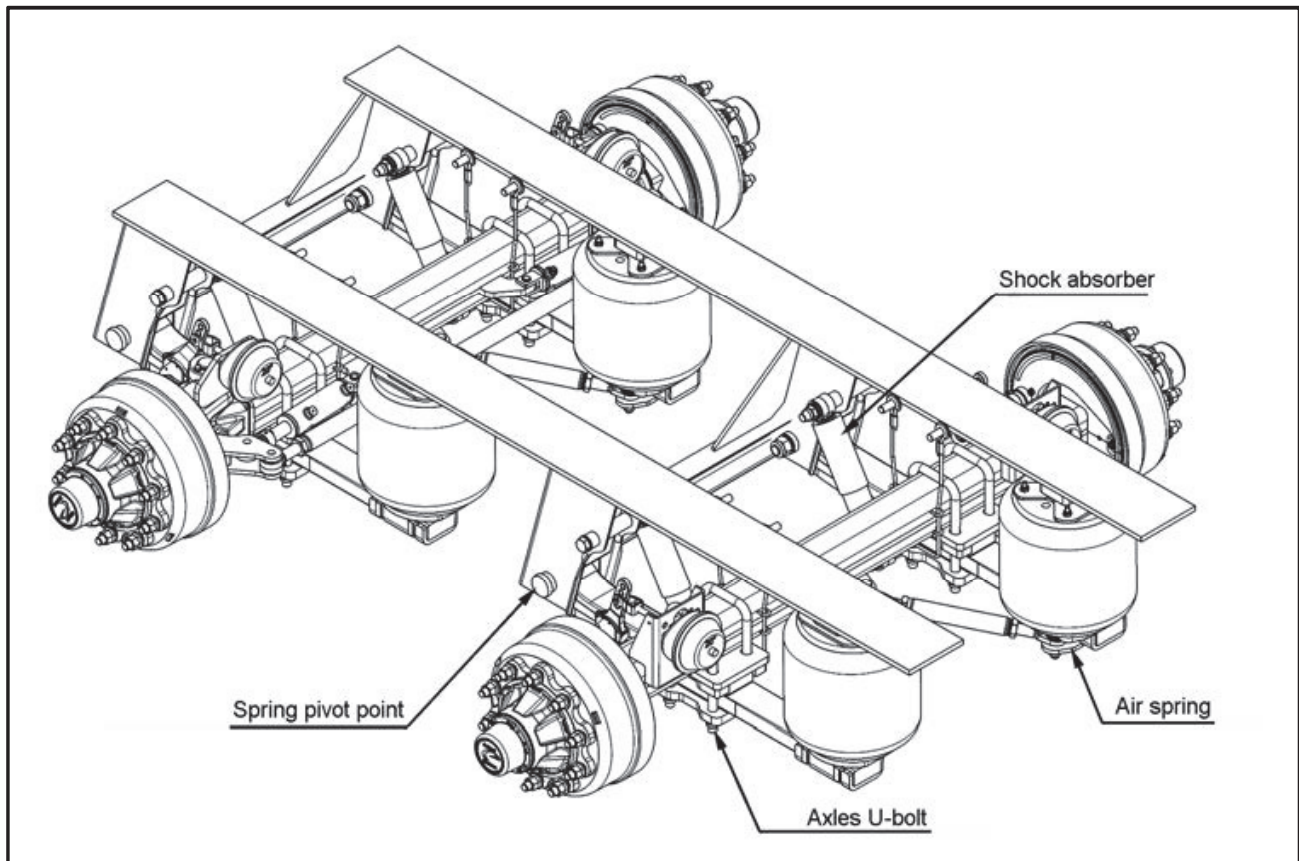
- Retighten all the axle U-bolt nuts. Tighten the nuts diagonally (*See chapter 10*).
- Retighten all the nuts and screws on the suspension, checking in particular that the spring flexible mountings are firmly clamped.
- Check that the outside of the air spring is not damaged or worn (rubbing) and that there are no holes, cracks, crazing or foreign bodies. Remove, if necessary, and replace the faulty parts.
- Check for air leaks and plug them
- Check for any leakage from the shock absorbers : poor road holding and wheels lifting on bad road surfaces are usually caused by faulty shock absorbers.
- Check the shock absorber flexible mountings by moving the shock absorber by hand
- Check the trailing arm flexible mountings and replace if necessary. If they are worn, the clearance can be seen by moving the vehicle backwards and forwards, with the wheels locked using the parking brake or chocks.

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

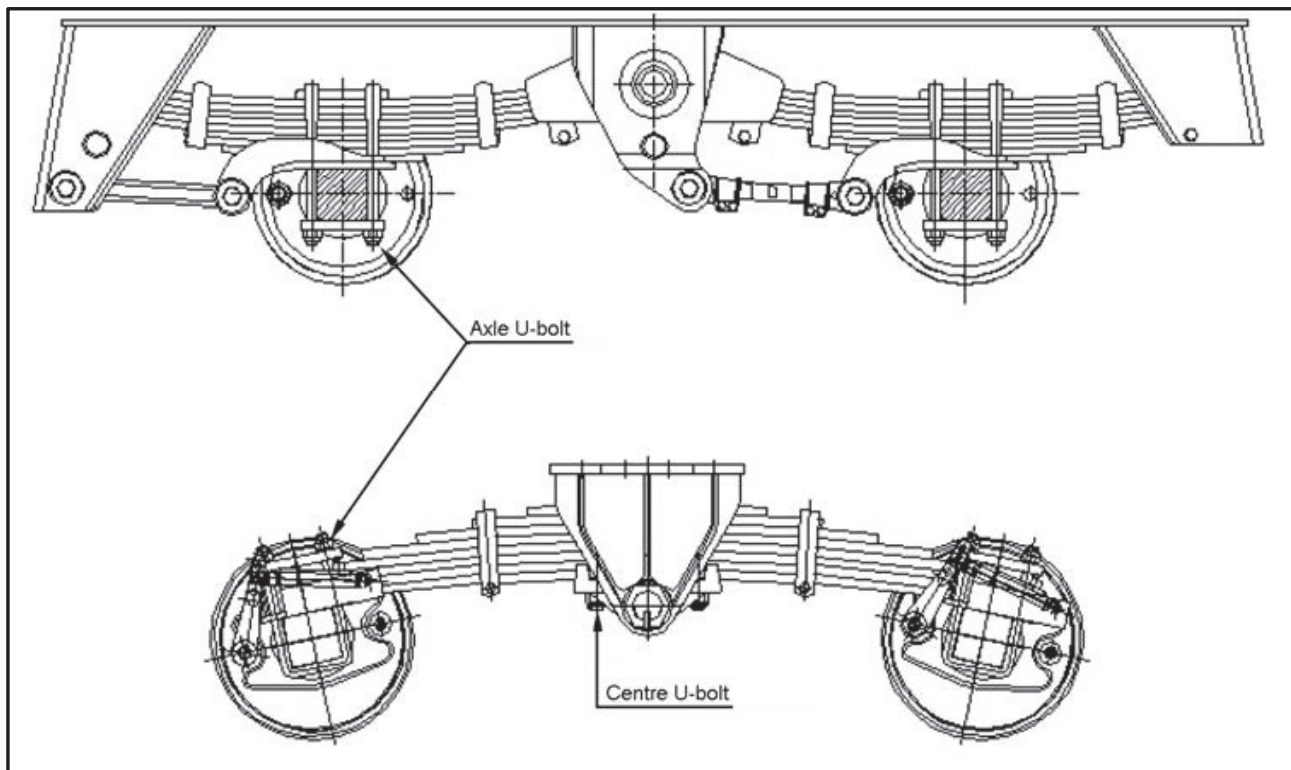
See the vehicle manufacturer's manual for the settings and maintenance of the air system.



NB : Before carrying out any work on hydraulic or pneumatic systems, take all necessary precautions to ensure that the hydraulic fluid or air is not under pressure.



10. U-bolt tightening torque



U-bolt	Torque
mm	mKg
Ø18	23
Ø22	45
Ø24	50
Ø27	60

11. Spring drawbar

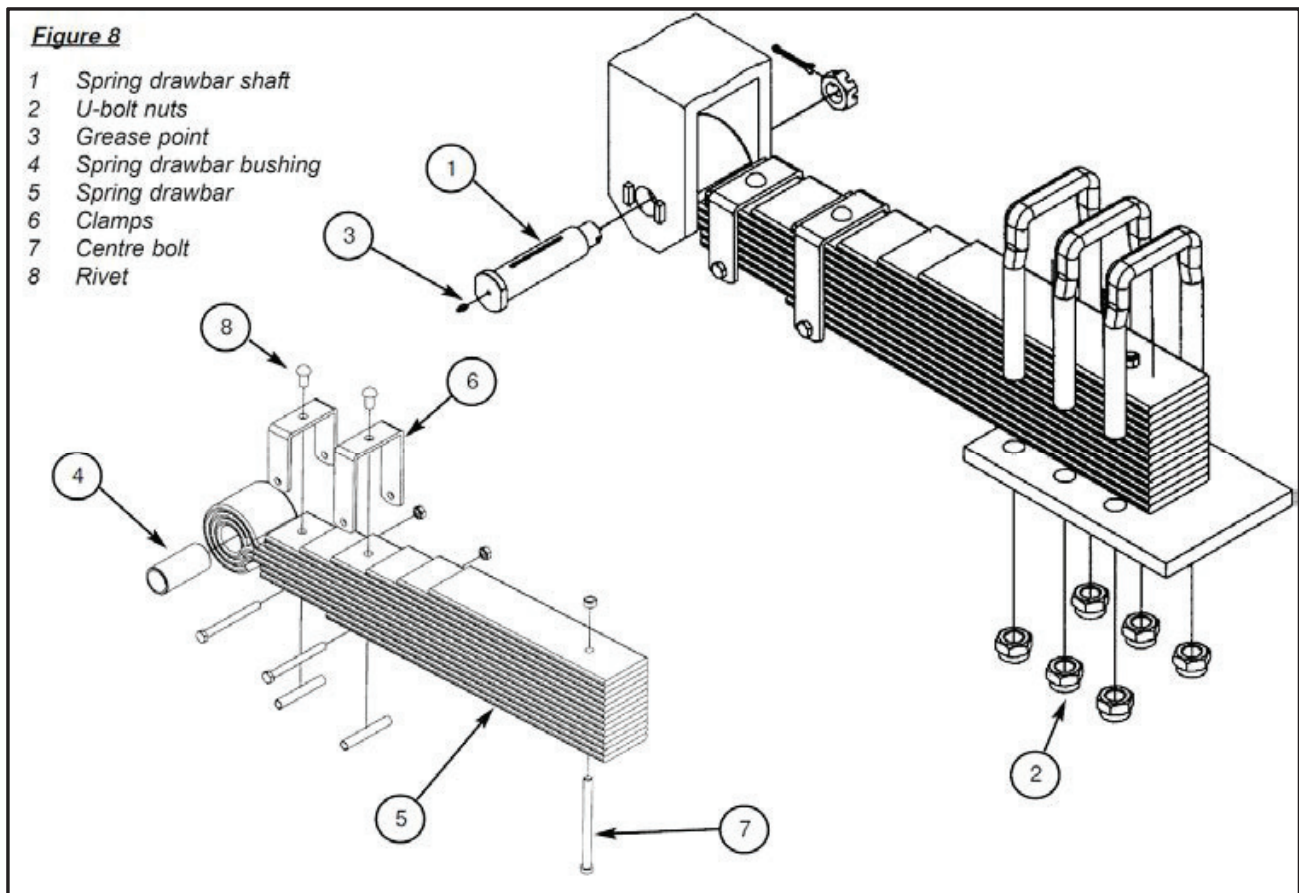
After the first laden journey, before intensive use or every 6 months : (See *figure 8*)

- Retighten all the mounting U-bolt nuts to the recommended torque *Item 2*.
- Lubricate the attachment shaft *Item 3*.

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

Every year :

- Check the clearance between the bushing *Item 4* and the spring drawbar shaft *Item 1*, and, if there is excessive clearance, replace the worn parts.
- Check the general condition of the spring *Item 5*, clean it thoroughly and brush the sides of the springs to check for cracks. Check the condition of the clamps *Item 6*.



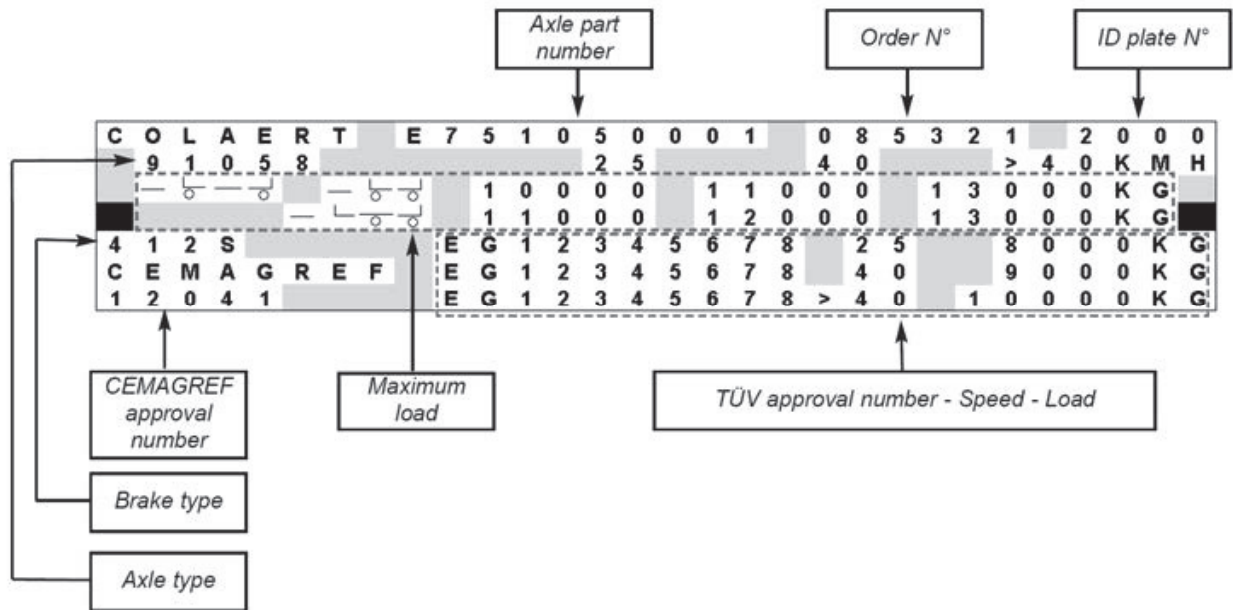
12. Spare parts



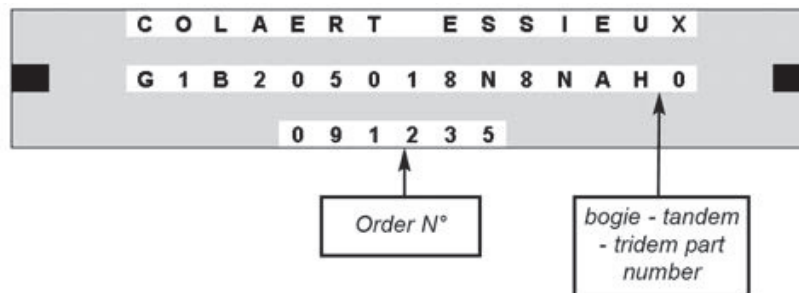
COLAERT ESSIEUX axles, bogie, tandem and tridem suspensions all have an ID plate. These plates are fixed to the axle shaft, the brake cover, the centre mounting bracket or the equaliser mounting bracket for tandems and tridems.

When ordering COLAERT ESSIEUX spares, please give the vehicle manufacturer all the information marked on these plates, as shown in the example below.

AXLE AND BRAKE ID PLATE (Riveted on the axle shaft)



BOGIE - TANDEM - TRIDEM ID PLATE



13. Minimum program of maintenance

This maintenance plan is intended for normal operating conditions. More frequent maintenance may be required for harsh operating conditions (construction sites, mountains, intensive use, etc)...

See the following paragraphs for detailed maintenance instructions.

On commissioning	After the first laden journey	After the first 1000 km	Every 3 months	Every 6 months or 25 000 km	Before intensive service	Every 2 years or 50 000 km
------------------	-------------------------------	-------------------------	----------------	-----------------------------	--------------------------	----------------------------

2.2 Axle, maintenance and adjustment

- 2.2.2 Tightening and retightening wheel nuts
- 2.2.3 Checking the hubcaps
- 2.2.4 Checking the wheel bearing clearance
- 2.2.6 Lubricating the wheel bearings

X	X	X		X		
X				X		
		X		X	X	
						X

2.3 Brake maintenance and adjustment

- 2.3.1 Initial checks
- 2.3.2 Checking brake clearance and wear
- 2.3.3 Adjusting brakes with fixed levers
- 2.3.4 Adjusting brakes with adjustable levers

X	X		X		X	
			X		X	
			X		X	
			X		X	

3.2 Classic steering axles

- 3.2.1 Routine maintenance (3.4.1 Dual Mode)
- 3.2.2 Checking the wheel alignment (3.4.2 Dual Mode)
- 3.2.3 Maintenance and servicing for blocking cylinders
- 3.2.4 Adjusting the clearance
- 3.2.5 Adjusting the full-lock angle

			X		X	
				X		
				X		
					X	
					X	

4.1 Manual self-steering axle

- 4.1.2 Routine maintenance (4.2.2 Automatic self steering axle)
- 4.1.3 Checking and adjusting wheel alignment
- 4.1.4 Adjusting the steering angles

			X		X	
				X		
					X	

5. Bogies suspensions

6. Basic tandem suspension and basic half-tandem suspension

7. Basic tandem suspension and basic half-tandem suspension

8 & 9. Hydraulics and air suspensions

11. Spring drawbar

	X			X	X	
	X			X	X	
	X			X	X	
	X			X	X	
	X			X	X	



14. Notes

A series of horizontal dotted lines for taking notes.



9CRCFA25

1) 14702020

2) 88800008

3) 82500012

4) 82500018

Kit ensemble frein A25, écrou, rondelle et clip



9RH0004

1) 814001017 012

2) 814001017 012

3) 814001400 011

4) 814001400 011

SPARE PARTS BRAKE KIT
FOR BRAKE TYPE :

JB-310E



9CRCR86

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