

SELF-STEERING AXLE MAINTENANCE



Contents of the manual

SECTION 03 - AXLE BODY USE AND MAINTENANCE

- 3.1 Disassembly and reassembly of critical components
- 3.2 Adjustment
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This operating and maintenance manual is an integral part of technical documentation relative to the SELF-STEERING AXLE.

The manual must be preserved with care and made known and available to all.
Read this sections with care before performing maintenance on the self-steeri
the safety conditions and reliability of the interventions that are performed.
For brakes/suspensions informations see the manufacturer manual.

WARNING

Maintenance procedures must only be performed by duly qualified and authorized personnel.

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3.1 Disassembly and reassembly of critical components

<u>WARNING</u>	<p><i>All disassembly and reassembly procedures must be performed:</i></p> <p><i>a) with the machine perfectly stopped</i></p> <p><i>b) in a working environment properly equipped with all necessary tools and without any dangerous situations</i></p> <p><i>c) carefully clean each component prior to reassembly. Degrease or lubricate depending on the component's function.</i></p>
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3.1.1 STUB AXLE PIN DISASSEMBLY

Replacement of the stub axle pin requires disassembly of the axle from the vehicle.

The sequence of procedures and the estimated stub axle pin disassembly and reassembly time, performed by trained personnel, are as follows:

Description of procedure	Time in minutes
Axle disassembly	60'
Axle reassembly	50'
Stub axle pin reassembly	50'
Toe-in	30'
TOTAL PROCEDURE TIME	190'

3.1.2 AXLE DISASSEMBLY

1. Check that the automatic tierod locking cylinder is engaged. Otherwise activate the locking control.
2. Lift the rear of the vehicle until the wheels are slightly raised off the floor.
3. Place strong support struts under the axle.
4. Loosen the wheel nuts.
5. Remove the wheels.
6. Uniformly lift the rear part of the vehicle.
7. Loosen the axle fastening U-bolts.
8. Remove the axle from the suspension arms.

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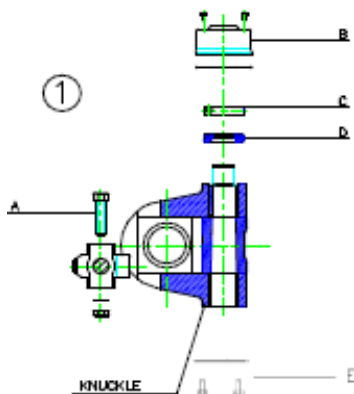
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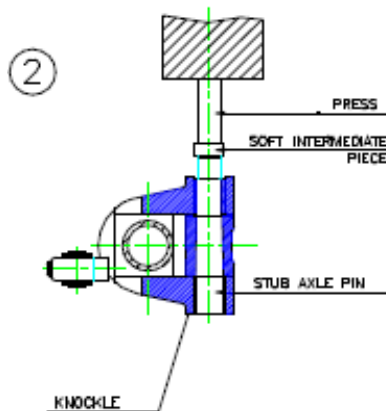
3.1.3 STUB AXLE PIN DISASSEMBLY

PERFORM THE FOLLOWING PROCEDURES WITH THE AXLE ON THE GROUND



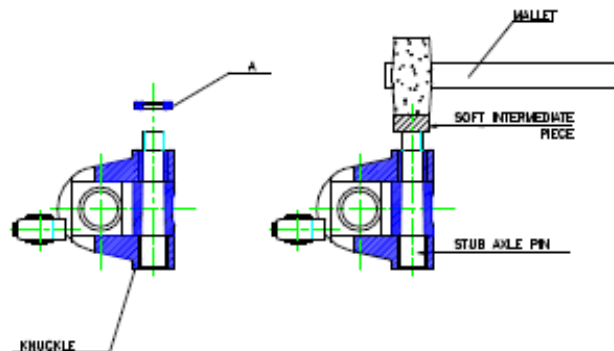
Remove shock absorber (see section 3.1.9) and locking device (see section 3.1.7)

- A. Loosen and remove the lower nut from the silentbloc cylindrical screw. Repeat from the opposite side of the tierod. Support the tierod and remove it.
- B. Remove the protective cover
- C. Loosen the adjustment ring nut screw using an 8 mm hex wrench.
- D. Loosen and remove the ring nut and the shim ring.
- E. Loosen and remove the bottom cap



Use a hydraulic press or heavy mallet to extract out the pin as illustrated, inserting a soft piece of bronze or aluminium between these parts.

Example of disassembly using a mallet and a soft intermediate piece.



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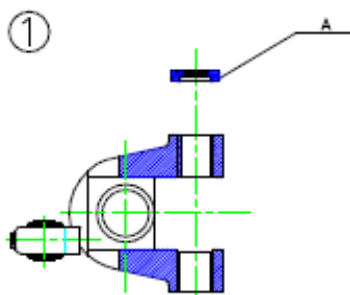
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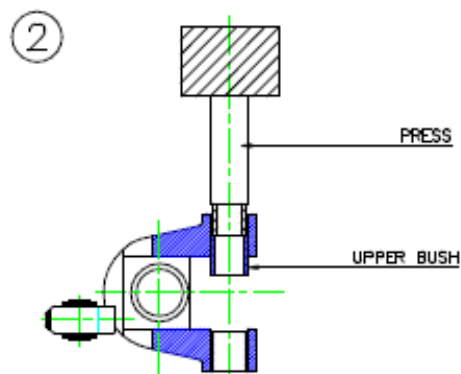
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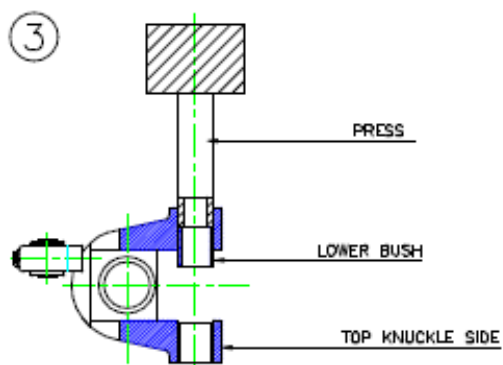
3.1.4 EXTRACTING THE UPPER AND LOWER BUSHES



1. Pull out shim ring A using a tube with a diameter 0.5 mm less than the diameter of the bush seat.



2. Press out the bush by pushing it towards the inside of the knuckle using the tube. We recommend using a hydraulic press or a mallet to extract the bush.



3. Turn the knuckle over and repeat these extraction procedures to remove the lower bush.

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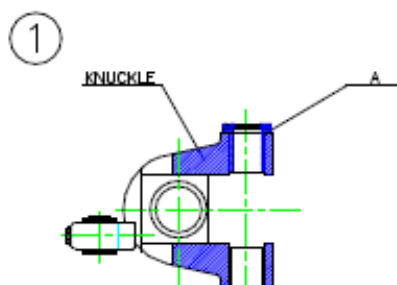
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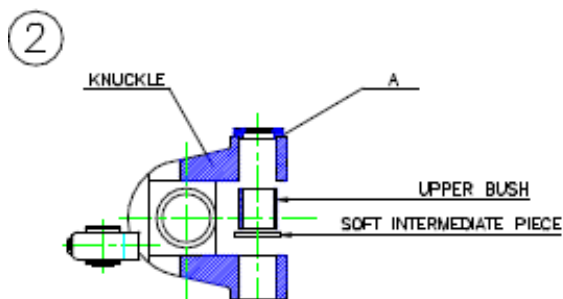
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3.1.5 BUSH REASSEMBLY

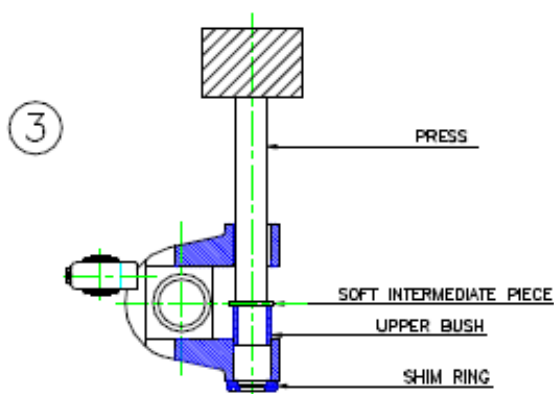
WARNING Bushes are inserted from the inside out and must be forced into their installation seat.



1. Insert shim ring (A). In the knuckle hole on the side opposite the four holes




2. Insert the bush in its seat and set a plate of soft steel up against it. Check that the plate is horizontal.

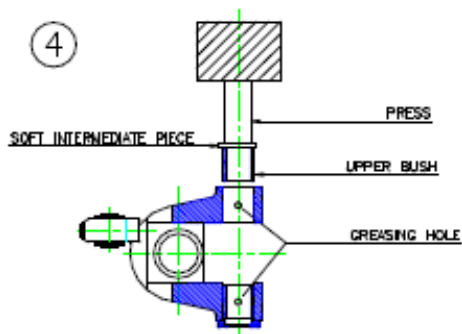


3. Turn the knuckle over and, using a 300 mm tube and a press or a mallet, force the bush into its seat and reach a pressure level so that the thrust-bearing ring is also in its seat.

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4. Repeat these procedures to insert the lower bush.

WARNING *Before fitting the king pin drill the upper and lower bushes in the grease nipple area (6/7 mm diameter holes). Clean all shavings out from the holes. Use the wheel pin to make sure it rotates perfectly in the bushing housing. Remove all impurities as necessary.*

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3.1.6 REASSEMBLY OF KNUCKLE, WITH REPLACED BUSHES ONTO THE AXLE BEAM

1. Position the knuckle on the axle body.
2. Insert the pin in order to create a hinge connection between head - axle body and knuckle.
3. Use a hydraulic press to force the pin into its seat with a 400 da (4 tons) force. As an alternative this job can be done by hammering with a suitable mallet. In both cases always insert a piece of soft steel between these parts to avoid cold-heading the pin.

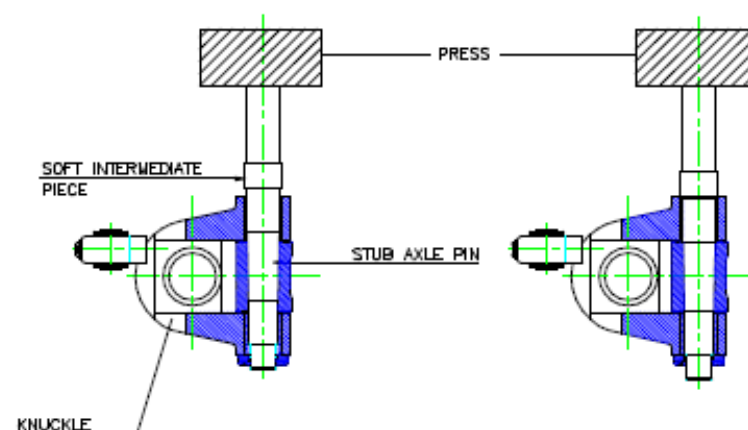


Figure G - Knuckle reassembly

4. Install the thrust bearings (shim rings), lubricating sliding parts with grease.
5. Adjust hinge sliding by the coupling using the adjustment ring nut. Procedures are identical to those used to adjust clearance.
6. Reassemble the tierrod, lubricating its grease points (paragraph 6.0). When this is done check the condition of the bushes. These must be replaced if they are worn.
7. Check and adjust toe-in according to the instructions in the chapter: "Adjusting toe-in".
8. Reinstall the axle on the vehicle by performing disassembly procedures in reverse order.

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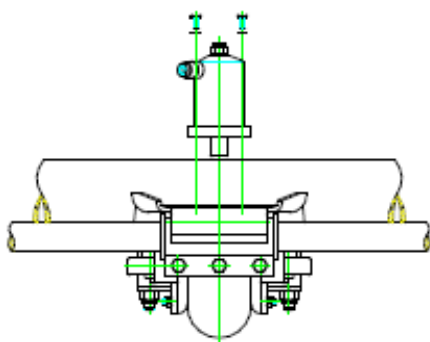
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3.1.7 DISASSEMBLY OF THE LOCKING DEVICES

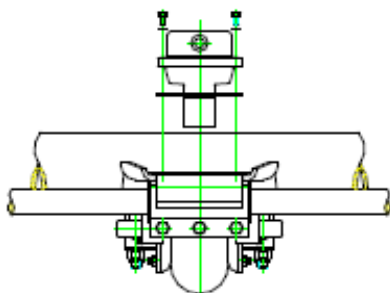
The axle can be equipped with two different lock systems as illustrated below

3.1.7.1 LOCKING CYLINDER



1. Check that the locking cylinder is not pressurised.
2. Remove the 4 screws and the washers.
3. Remove the sensor connection.
4. Remove the locking cylinder.


3.1.7.2 BRAKE CHAMBER 9"



1. Check that the brake chamber is not pressurised.
2. Detach the air intake.
3. Remove the 4 screws and the washers.
4. Remove the brake chamber.

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3.1.8 REINSTALLATION OF THE LOCKING COMPONENTS

3.1.8.1 LOCKING CYLINDER

1. Place the locking cylinder on its support. Fasten it in place with the 4 screws. Tighten it with a torque of 37-40 Nm. Make sure you use new washers.
2. Connect the locking cylinder air intake.
3. Pressurize the circuit.
4. Test for proper locking.

3.1.8.2 BRAKE CHAMBER 9"

1. Place the brake chamber on its support. Fasten it in place with the 2 screws. Tighten it with a torque of 37-40 Nm. Make sure you use new washers.
2. Connect the brake chamber air intake.
3. Pressurize the circuit.
4. Test for proper locking.

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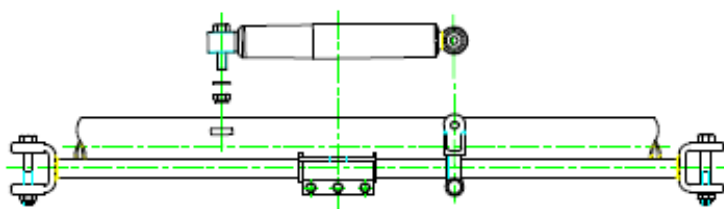
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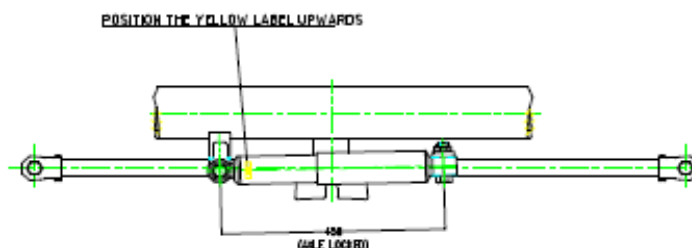
3.1.9 SHOCK ABSORBER DISASSEMBLY

1. Check that wheels are aligned.
2. Remove the self-locking nuts on the shock absorber, the washers and the 2 shock absorber screws.
3. Dismantle the shock absorber.



3.1.10 SHOCK ABSORBER REASSEMBLY


1. Check that wheels are aligned.
2. Set the shock absorber on its fastening points (shock absorber head hooked to the support welded to the axle body) with the yellow label facing up. Insert screws and washers.
3. Tighten the self-locking nuts at a torque of 370 - 400 Nm.
4. Check that the shock absorber is about 450 mm long (with the axle in the locked position).
5. Position of the yellow label or the mark "ALTO" facing upwards for correct oil flow.



WARNING *Replace the self-locking nuts during reassembly*

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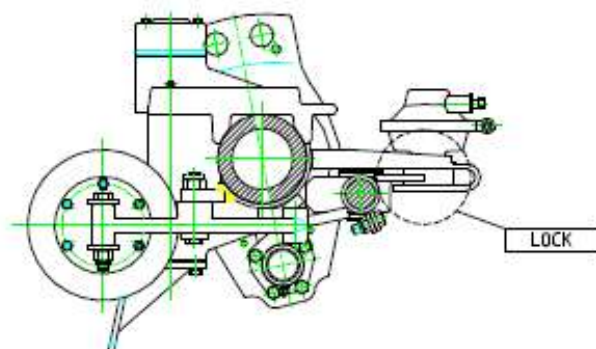
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3.2 Adjustments

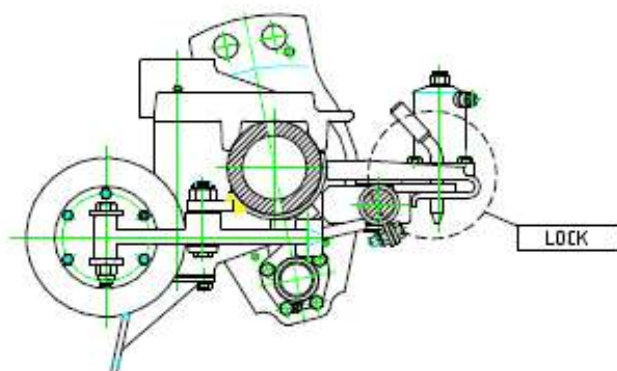
Self steering axles can be equipped with two toe-in adjustment systems:

1. With fixed bar
2. With threaded bar

3.2.1 ADJUSTMENT TOE-IN



1. Remember that to perform this procedure correctly, the pin of the locking cylinder and brake chamber must be correctly inserted in the support bracket.



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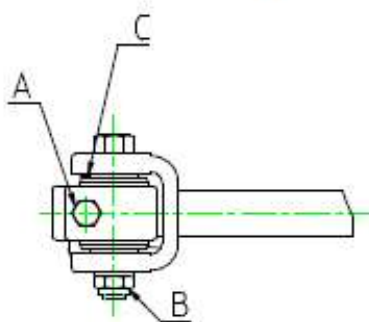
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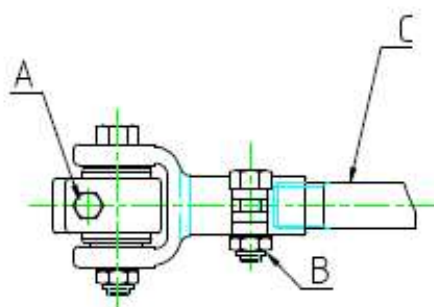
3.2.1.1 ADJUSTMENT OF TOE-IN WITH FIXED TRACK ROD



Loosen the screws that tighten the silentbloc arm and the screws that tighten the fork.

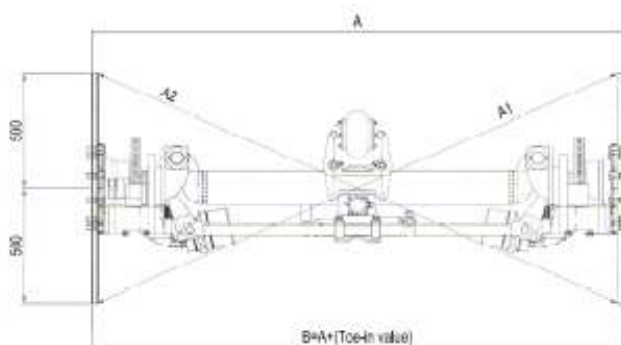
Adjust toe-in and symmetry by rotating silentbloccs C or the knurled screw on the notch either to one side or to the other.

3.2.1.2 ADJUSTMENT OF TOE-IN WITH THREADED TRACK ROD



Loosen the screws that tighten the silentbloc arm (A) and the screws that tighten the fork (B).

Adjust toe-in by rotating track rod clockwise or anticlockwise.



Check that toe-in corresponds to the manufacturer's specifications (see illustration to the left).

Once toe-in is correct retighten the screws that were previously loosened. Use the tightening torque specified in the relative paragraph.

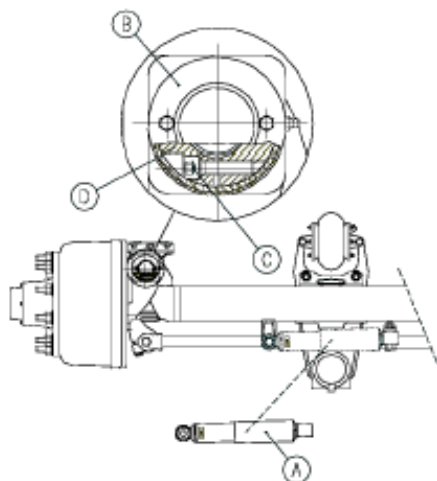
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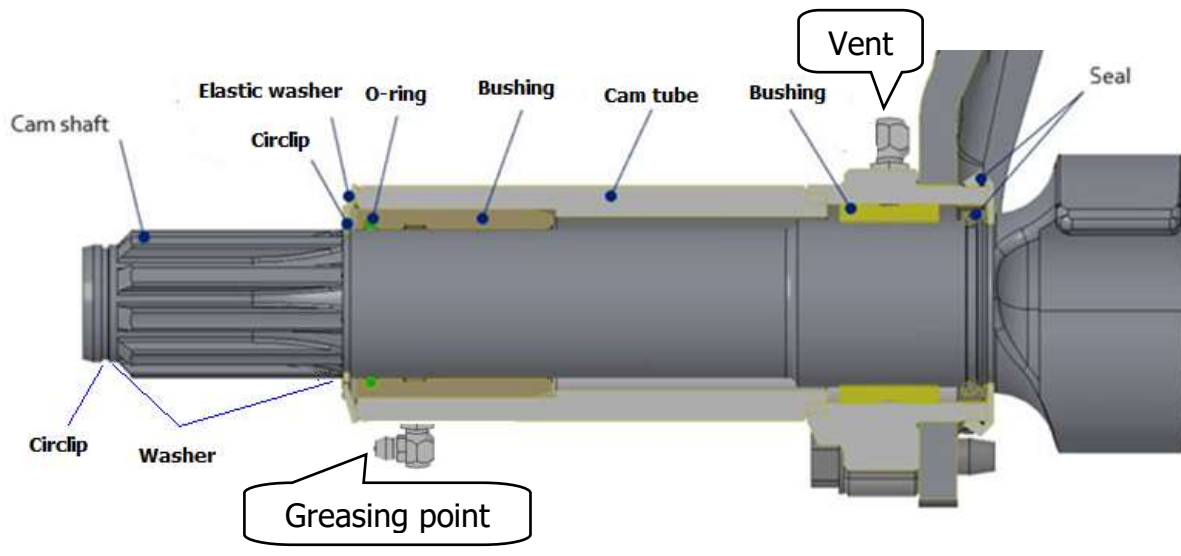
3.2.2 ADJUSTING PIN CLEARANCE



1. Disconnect shock absorber (A) from the tierod.
2. Remove protective cover (B) from the stub axle pin adjustment nut.
3. Loosen screw (C) using an 8 mm hex wrench.
4. Fully tighten adjustment nut (D) until clearance is eliminated.
5. Untighten adjustment nut (D) in order to obtain a vertical movement equal to 0.2-0.4mm (measured with a comparator), which corresponds to a 1/3 – 1/4 turn of the adjustment nut. After this operation you must obtain a fluent rotating movement of the knuckle
6. Finally tighten screw (C) with 37-40Nm torque and fit the protective cover (B)
7. Lubricate king pin (see section 2.3)
8. Install shock absorber (A)


Replace the pin whenever clearance cannot be eliminated or in any case every 400,000-500,000 km.

S-cam and s-cam tube layout and components, Refer to Parts View **Bulletin No: KPS-001-0513.**



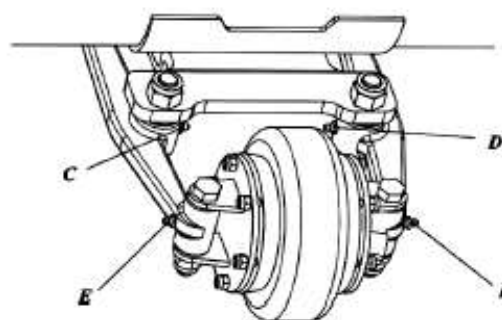
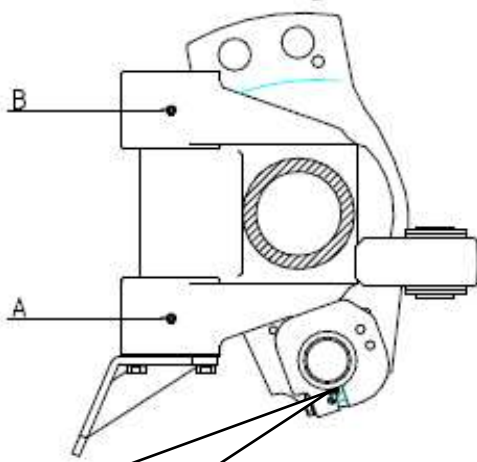
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3.3 Lubrication

Refer to the figure below for lubrication.




Brake Camshaft Holder

See the following table for type of lubricant, quantity and frequency of lubrication:

IND.	LUBRICANT	QUANTITY
A	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts. (both side)
B	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts (both side)
C	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts
D	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts
E	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts
F	Autogrease 1.7 or equivalent	As needed till lubricant exits from parts
BRAKE CAMSHAFT HOLDER	Autogrease 1.7 or equivalent	As needed till the camshaft and the bushes are lubricated

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3.4 Periodic maintenance

The periodic maintenance schedule that is indicated refers to standard operating conditions. The schedule may need to be changed case by case depending on the intensity of use. We recommend complying with the schedule. The fleet maintenance manager, driver or owner must always comply with the manufacturer's instructions and warnings.

PREVENTIVE MAINTENANCE SCHEDULE						
TYPE OF INTERVENTION	START UP	km. traveled/period				
		FROM 500 TO 1.500	every 5.000 km or every 2 months	every 25.000 km or every 4 months	every 50.000 km or every 6 months	every 100.000 km or every 12 months
Tighten nuts and bolts		✓			✓	
Lubrication				✓		
Check toe-in		✓		✓		✓
Check geometric layout					✓	✓
Check pin wear						✓
Check tire wear			✓			

WARNING *The tightness of wheel screws must be checked every day during the first week of work.*

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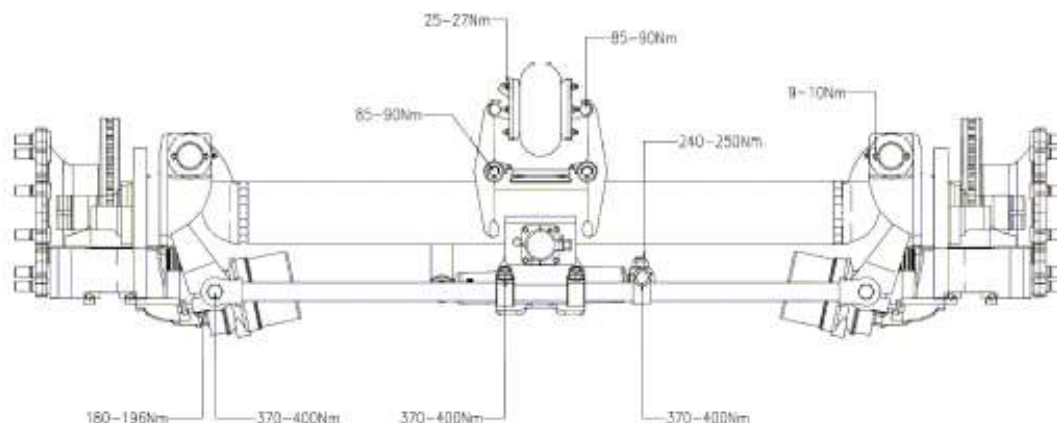


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3.5 Tightening torques

3.5.1 AXLE BEAM

<i>Description</i>	<i>Tightening torque</i>
	<i>Nm</i>
Fastening screws for dust cover	9 - 10
Adjustment ring nut screws, lock cylinder	37 - 40
Knuckle arm screws	180 - 196
Screws fastening the sleeve - arm and forks on the tierod	73 - 80
Shock absorber and fastening nuts of forks on the spring bush pin	350 - 370
Correction fulcrum pin fastening nuts	85 - 90
Air cushion support fastening nuts	25 - 27
BC bracket screws	40 - 44



Note: For wheel end maintenance, refer to AXLE MAINTENANCE
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