Front end, steering

63 Steering linkage system

The best method for **checking condition, play** etc is with the vehicle on a flat surface and two mechanics working as a team.

One of the mechanics turns the steering wheel one way and then the other and checks its function, mounting and condition, also the mounting for the steering column (with or without power assistance), while the other mechanic checks for play in the following places:

- Tie rods (there must be no looseness in the ball joints)
- Steering rods and king pins (there must be no looseness in the ball joints)
- Link rod ends (there must be no looseness in the ball joints)
- Check the axial play of the ball joints using a polygrip pliers and measuring tape. Max. permitted axial play is **2 mm**.
- Pitman arm on steering gear well tightened and locked.
- Steering gear mounting on frame.
- Steering shaft universal joints from steering gear and upwards (there must be no looseness in the joints).
- Steering column – sliding joint.
  Max. 1.5 mm movement at arrow "A".
  If movement of universal joints is included, total movement at arrow "A" is max. 5 mm.
  Max. clearance between splines 0.3 mm.
- Check all clamps for proper mounting and tightness at arrow "B".
- With twin front axles also check connection between relay arm and its ball joints on front axles.
- **For Rear Steering**: same as above.

64 Gaiters for ball joints

Check that the rubber gaiters for the ball joints on the link rods and track rods are intact and do not leak.

65 Shock absorbers, front

Visually check:

- the rubber bushings
- that the retaining nut at the eyelet is tightened down
- that the bracket is in good condition and that the bolting is tight
- if there is **oil leakage**, note this.

66 Steering knuckle journalling

1. **Check the axial play between the steering knuckle and front axle member (A).**

- When check-measuring, the truck must have its wheels on the floor in order to load the king pin journals.
- Measure the play (clearance) between the steering knuckle and the front axle member using a feeler gauge.
  Permitted value **A = 0.05–0.15 mm**.

  Also applies to rear steering.

2. **Check the radial play in king pin bushing**

- Place trestles under the front axle.
- Apply the service brakes so that play in the wheel bearings does not influence results. Measure the total movement of the tyre outer wall at measuring point C.
- The table shows how much the wheel should move in mm at the measuring point for various dimensions of tyre.

The line C–D corresponds to a radial play of 2 mm in the bushing = max. permissible wear.
A = Tyre dimension
B = Movement of wheel in mm at measuring point

Example: Start with the vehicle's tyre size (e.g. 20"). Move horizontally to the right to line C–D. From here, proceed vertically down to 5.25 mm for 20".

With the check, the measured value must not be o right of the unbroken line C–D in the table.

Also applies to rear steering.

67 Front wheel journalling

The front end of the truck must be lifted during the check.

Using a wheel spinner listen to the bearings when rotating the wheel. Note any unusual sounds.

Check the wheel bearing play with a dial indicator.

1. Clean round the hub cap.
2. Grease-lubricated bearing: unscrew the hub cap.
   Oil-lubricated bearing: unscrew the oil plug in the hub cap.
3. Measure the front wheel bearing play using a dial indicator.
   Set the measuring probe of the dial indicator:
   - against the stub axle (grease-lubricated)
   - through the hole in the hub cap (oil-lubricated).

Permitted axial play: 0.04–0.12 mm
Note! Max. play within tolerance range is recommended.

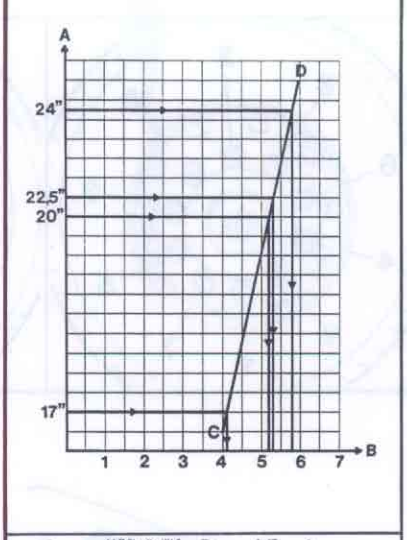
4. Screw on the hub cap (grease-lubricated) respectively the plug in the hub cap (oil-lubricated).

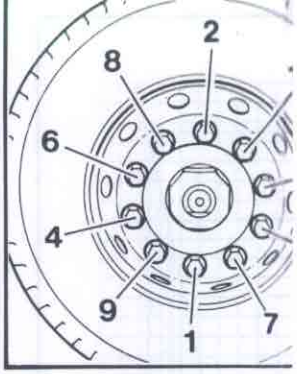
68 Front wheels

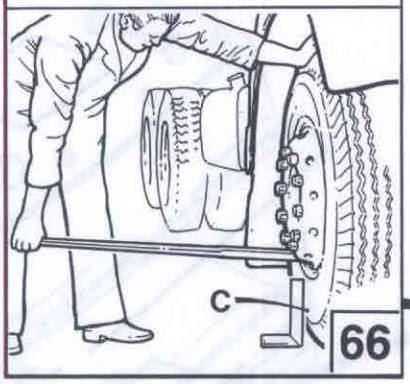
Disc wheels
Check wheels for cracks and rust, which can indicate loose nuts or broken stud bolts.

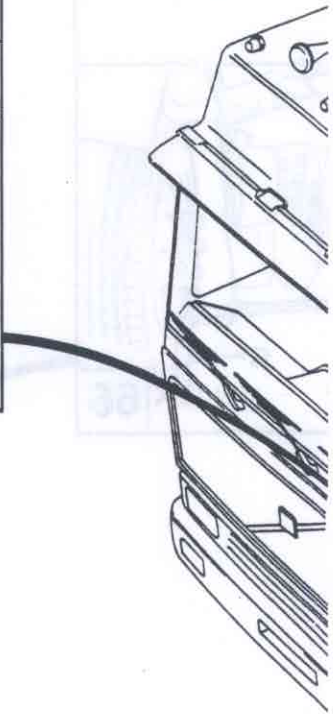
Spoke wheels
Check that:

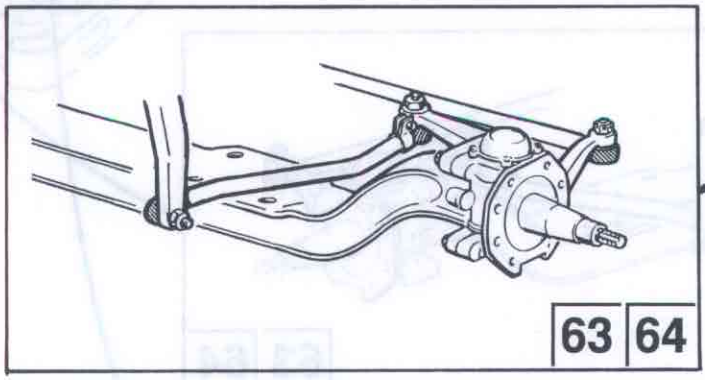
- all wheel nuts and retainers are in position
- fitting has been correctly carried out, the wheel is centred.

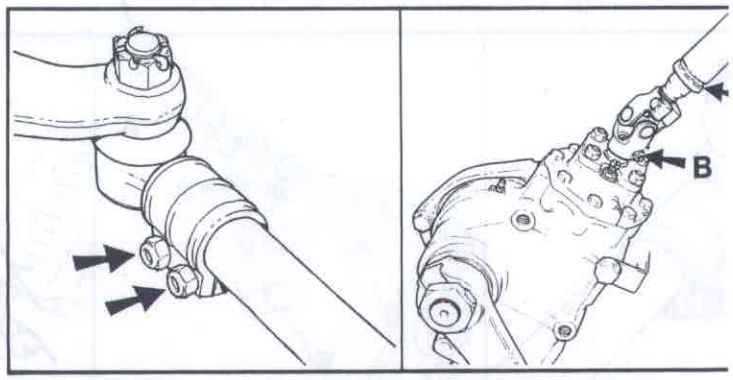


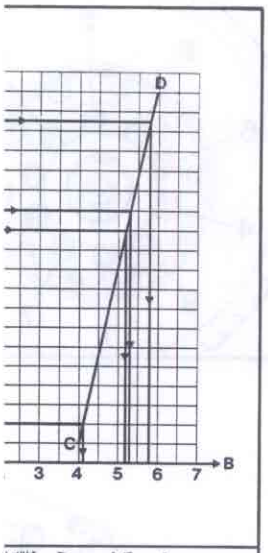








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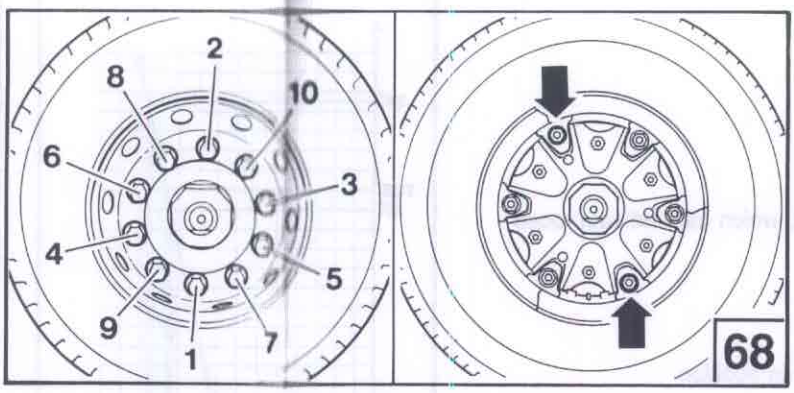
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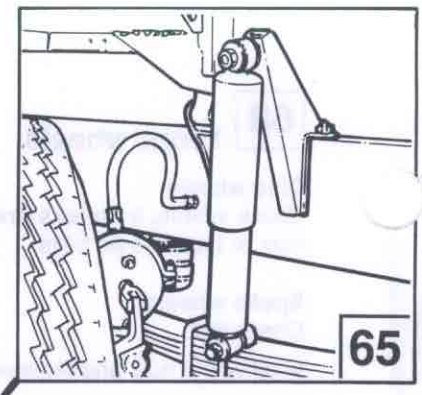
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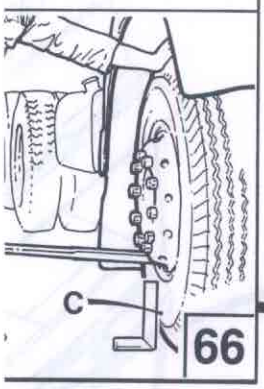
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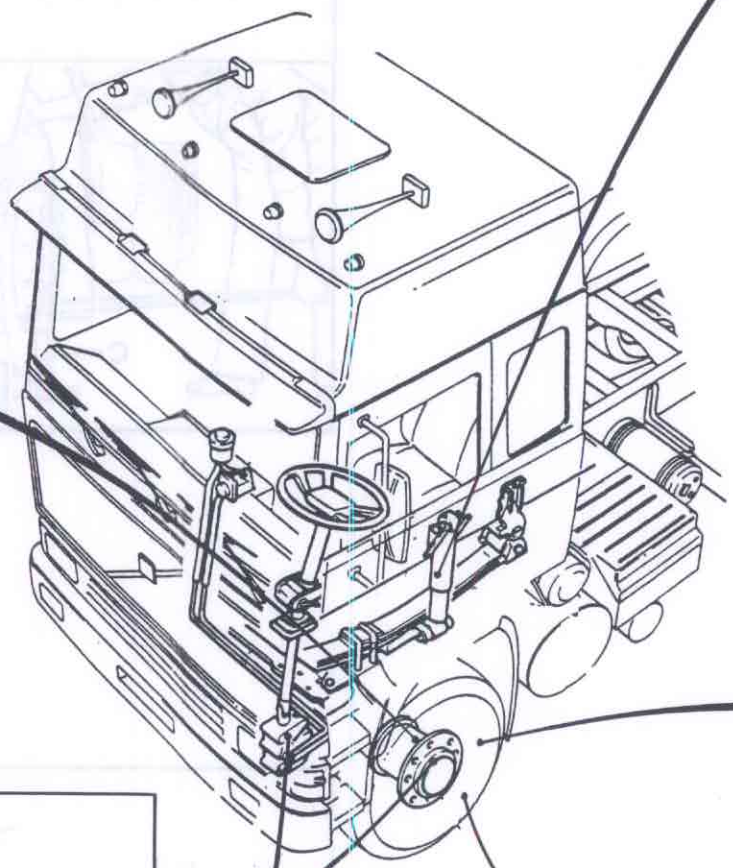

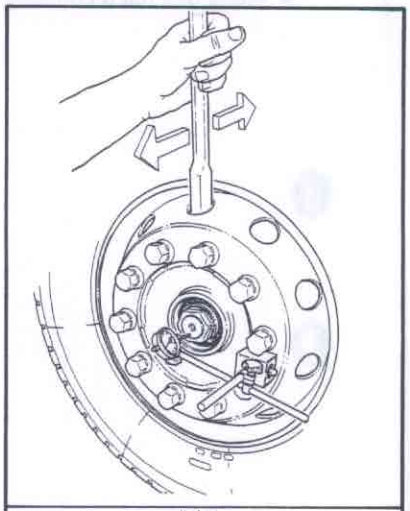

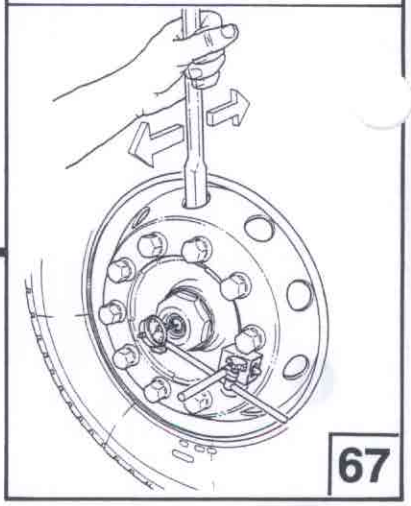
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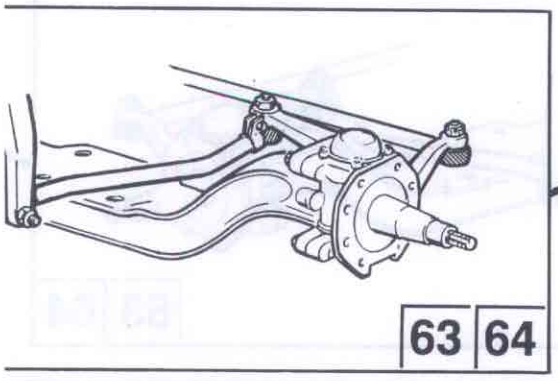
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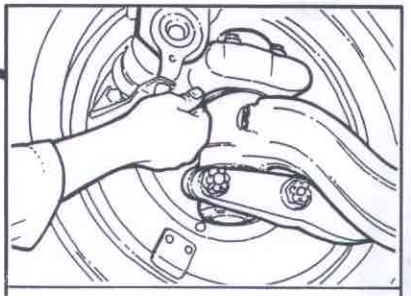

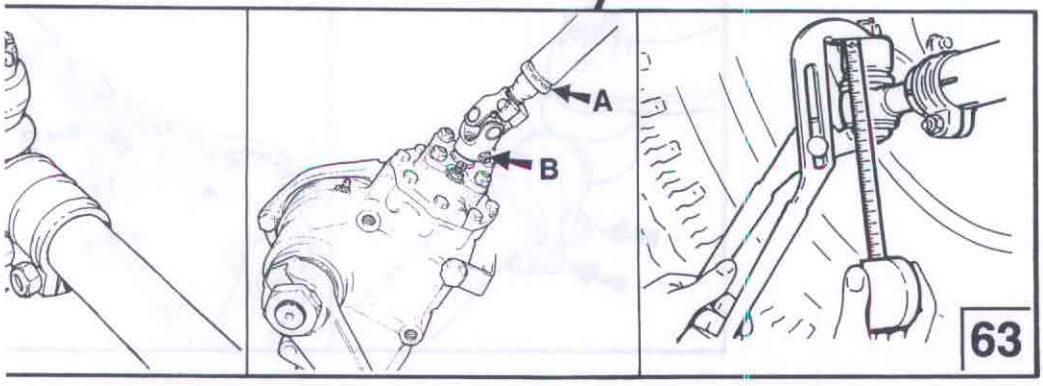
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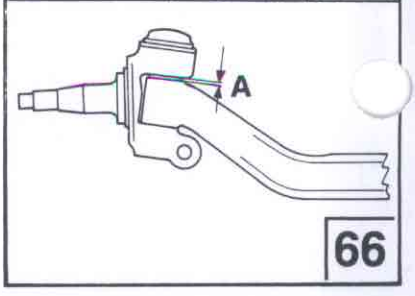
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Checks under the vehicle

69 Clutch

Check for play in the mechanical function of the clutch.

- Check that the return springs are in position and are functioning satisfactorily.
- Check forks and clevis pins for wear.

No play at release lever.

70 Clutch

Check the pneumatic and hydraulic control system of the clutch.

1. Master cylinder
   Check for leakage and that the plunger returns correctly.
2. Slave cylinder
   Check for leakage, that the plunger returns correctly and that the gaiter is intact.
3. Check the air hoses for kinking.
4. Clutch servo (Volvo)
   Listen for any air leakage (at arrow) when operating the clutch. Leakage or when measurement **A** approaches 32 mm means that it is time for adjusting.

   Note!
   With **KFD 117D** and **KFD 216A** air leakage can occur at approx. 21 mm.
   Basic setting **A** = 40±1.5 mm.
5. If necessary, adjust basic setting **A**.

71 Gearbox

Check the mechanical and pneumatic control system of the gearbox.

1. Check for air leakage.
2. Check play **C** between the splitter gear lever and inhibitor valve. Adjust if necessary.
   NOTE! The **C** measurement must not be adjusted until the clutch setting has been checked.

Stroke length **D** is adjusted with the pedal adjusting screw on the cab bulkhead.

Clutch servo	Measurement in mm				
	A	B max	C	D	L
KFD 116A KVD 117A KFD 117A KFD 117B KFD 117C	45±1.5	105	9.5	30–32	170
KFD 117D	40±1.5	100	9.5	30–32	170
KFD 214A KFD 215A	45±1.5	105	13	30–32	150
KFD 216A	40±1.5	100	13	30–32	150

Measurement A = Basic setting when fitting. This measurement should be obtained when the gearbox lever in its forward position coincides with the hole in the plunger rod fork.

Measurement B = The distance between the centre of the clevis pin and the wall of the clutch servo. Note! The measurement must not exceed the stated value.

Measurement C = Clearance between the splitter gear lever and the inhibitor valve.

Measurement D = Stroke length of the clutch servo.

Measurement L = Lever length, gearbox.

72 Speedometer sensor

Check that the anti-tamper seal for the speedometer sensor on the gearbox is intact.

73 Gearbox, leakage

Check for possible oil leakage.

NOTE! Differentiate between leakage and sweating. If oil is visible shortly after cleaning, this can be regarded as leakage.

On the R 1000, R/SR 1400, R/SR 1700 gearboxes, an evacuation hose is fitted to the input shaft seal. The function of this hose is to drain off any oil from the clutch housing.

74 Gearbox, filter, ventilation

Check that:

- the gearbox ventilation is not clogged
- the clutch servo breather hose is connected to the gearbox breather pipe.

75 Gearbox, mounting

- Check that the **support beams** are in good condition and are positioned correctly.
- Check-tighten **bolting** with a fixed spanner.
- Check condition and location of **mount pads**. (Check with a jemmy.)

NOTE! On certain variants the gearbox is **only** suspended in the engine.

76 Propeller shafts – universal joints, slide joints and carrier bearing

1 Suspension

Check suspension mounting and condition of rubber.

The rubber must not be loose in the holder.

2 Propeller shafts

With the gearbox in neutral, check the propeller shafts for warp and damage.

3 Universal joints

- Feel each universal joint and check for wear. There should be no looseness in the joints.
- Visually check that bearing lock bolts are tight.

4 Slide joints

Turn and lift splined joints and check for wear.

Wear on the spline teeth flanks and top can give rise to vibration and bias. No definite limit to this backlash is given, but it should be observed and noted and pointed out to the customer.

77 Final drive: leakage, bearing play

- Check for oil leakage.

  NOTE! Differentiate between leakage and sweating.

  If oil appears immediately after cleaning, this is a sign of leakage.

- Check for pinion bearing play **by lifting and lowering the final drive flange. Any movement indicates a loose nut or loose bearing.**

Note! The pinion bearings (B) should always be preloaded.

Exception! 6x4 trucks have a large play at the input shaft **(C)** to the transfer differential gears, that is, the front final drive.

A 6×4 truck which has been in use for some time can show a larger radial play without this having any damaging effect on the transfer gear. During rotation, the shaft is balanced so that play is insignificant.

If there is no oil leakage, there is no reason for anxiety about the above-mentioned play.

78 Rear axle, ventilation

Check that:

- rear axle ventilation is not clogged
- the hose for ventilation is firmly attached.

79 Exhaust pipe, silencer

Visually check:

- the metal plating of the exhaust pipe and silencer
- the exhaust pipe and silencer suspension for cracks, loose bolts and rubber pads
- the attachment of the insulation protection.

80 Springs, U-bolts

Visually check:

1. for cracked or loose leaves, which can indicate a broken centre bolt.
2. Loose U-bolts are indicated by:
   - the spring assembly not being fully compressed
   - the spring assembly moving on shaft at attachment.

81 Anti-roll bar, stay

Check that:

- cross stays, reaction rods, V-stays, anti-roll bar and shackles are firmly attached
- loose nuts, bolts or cracks are not evident.

The presence of rust can indicate loose bolts.

82 Axle suspension, front and rear

1. Check for play in the **spring shackle bolts** with the help of a crow bar.
   Max. permitted radial play (before replacement): bolt-bushing (applies both to unthreaded and threaded bolts)

   Bolt diameter 20–24 mm: max. play 3 mm
   24–30 mm: max. play 4 mm
   30–40 mm: max. play 5 mm

   Spring shackle bolts in rubber bushings

   No axial or radial play permitted. The rubber mounting may give way a little when checking it. This must **not** be confused with play.
2. Check that the spring anchorages are firmly attached and that there is no evidence of cracks.
   The spring shackle bolt must not be loose in the spring anchorage.
3. Check the roller where the equalizing beam is connected to the spring.
   Check the roundness of the roller and that it is not loose. Uneven wear = the roller binds.
4. Check for wear in the cross stays, reaction rods, V-stays and anti-roll bar. There must be no play in ball joints or bushings. Use a crow bar when carrying out the check.
5. Check for wear in the attachments and clamps. The presence of rust can indicate loose bolts and nuts.

83 Shock absorbers, rear

Visually check:

- the rubber bushing
- that the retaining nut at the eyelet is firmly attached
- that the bracket is in good condition and that the bolting is tightened
- if there is **oil leakage**, note this.

84 Bogie lift

Check:

- that there is no leakage in the bogie lift and control system
- the condition of the mechanical parts, also check that there are no cracks or loose bolts
- the hydraulic cylinder respectively air bellows attachments.

85 Air suspension, rubber bellows

Visually check that:

- there is no air leakage
- the air bellows are undamaged

86 Chassis frame, crossmembers

Visually check:

- frame members and crossmembers with regard to cracks and warping
- that there are no loose bolts or rivets.

87 Brake lines

Check all brake lines and brake hoses for leakage, scuffing and exterior damage.

88 Drive wheel and trailing wheel bearings

- Check wheel bearing play with the brakes released and the rear of the truck raised up. The play should be 0.04–0.12 mm.

  Carry out the check by lifting the wheel using a crow bar as a lever placed in a relief hole in the rim.

  If any play can be detected, it means that play is over the permitted limit, and adjustment should be carried out.
- Check the condition of the bearings in the trailing wheels. Use a wheel spinner and listen for possible abnormal noise.
- Balance arm bushings: it should not be possible to detect any play.

89 Drive wheel and trailing wheels

Disc wheels

Visually check the wheels with regard to cracks and rust, which can indicate loose nuts or broken stud bolts.

Spoke wheels

Visually check that:

- all wheel nuts and retainers are in position
- mounting has been properly carried out and the wheel is centred.

90 Differential lock

- Engage the diff. lock with the switch in the cab. Rotate one of the drive wheels and check that the other wheel on the axle also rotates.
- Check that no leakage is present at the diff. lock cylinder.
- Check that the air and electrical lines to the diff. lock are undamaged and properly clamped.

91 Brake linings

1 Disc brakes

- Check the thickness of the brake pads. Minimum permitted thickness: 2 mm (new: 16 mm).
  Note! Observe and note uneven wear, also note the thickness of the brake pads.
- Check brake caliper connections for leakage.
- Check the condition of the discs with regard to cracks, wear, rust.
- Check condition and attachment of the brake calipers.
- Check the function of the plungers **only** if the pads indicate uneven wear. Check by applying brake pressure and observing the movement of the plungers.
- Check that the length of the parking brake cylinder push rod is correct, with brake released. Min. pressure 650 kPa.

2 Wedge brakes

- Check the thickness of the brake linings.
  Minimum permitted thickness: 5 mm (single wedge brake)
  7 mm (double wedge brake)
  Note lining thickness.
- Check the automatic slack adjuster.

  Use a feeler gauge to check clearance between lining and drum.

  NOTE! If clearance exceeds 1.5 mm, the automatic slack adjuster is not functioning.

3 Z-cam brakes

Check the thickness of the brake linings.
Minimum permitted thickness: 5 mm.

Z-cam brakes

- Manual adjustment (newly adjusted brakes)

Lever length (B)	Travel length (C)
125/140/155	25–30 mm
170/180	35–40 mm

- Automatic adjustment

Min.	17 mm
Max.	51 mm

A	B	C
16	125	30
16	140	30
20	125	30
20	140	35
24	125	30
24	140	35
24	155	40
24	170	45
24	180	50
30	125	35
30	140	40
30	155	45
30	170	50

A = Brake cylinder size in square inches
B = Brake lever length in mm
C = Guide value for brake lever travel length in mm, cold brakes.

C = b–a.

Correct lever travel length indicates that the automatic adjustment is working correctly.

92 Brake cyliners, travel length – brake lever, forks

Lever travel, brake lever (C)

The check must be carried out with the system fully charged (brake pressure 600 kPa). Apply the brakes a few times before carrying out the check.

1. Release the hand brake. Apply the footbrake with the help of a pedal jack placed against the brake pedal.
2. Check that:
   - the brake cylinders do not leak
   - the brake cylinder and brake caliper are firmly attached and are free from cracks
   - the brake levers and forks are in good condition
3. Measure up the distance **b** according to sketch.
4. Release the footbrake and measure up the distance **a** according to sketch.
5. Calculate the lever travel length **C** (C = b–a).

93 Load-sensing valve

1. Check
   - bolting
   - the linkage system springs, cables and stays with regard to condition
   - that the valve does not seize by manipulating the lever.
2. Check the setting of the load-sensing valve. If necessary adjust the setting according to the Service Manual.

94 Bogie, axle distance

Special tool: **2780**

Decide on the need for measuring by noting tyre wear (toe-in faults, axle out of line)

There may be only a difference of **max. 1 mm** between axle distances on right-hand and left-hand sides.

This is on condition that the axles are at right angles to the frame.

95 TEST DRIVING