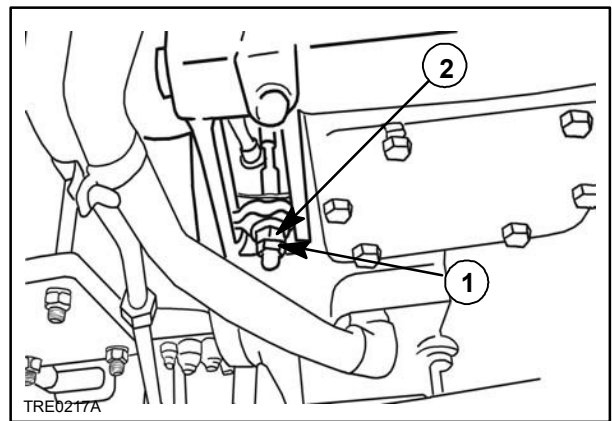


HAND BRAKE CONTROL**Adjusting travel (Op. 33 110 08)**

The travel of the parking brake control lever must be adjusted whenever work is carried out on the unit and when the lever is not on the third notch of the gear sector when the brake is engaged.

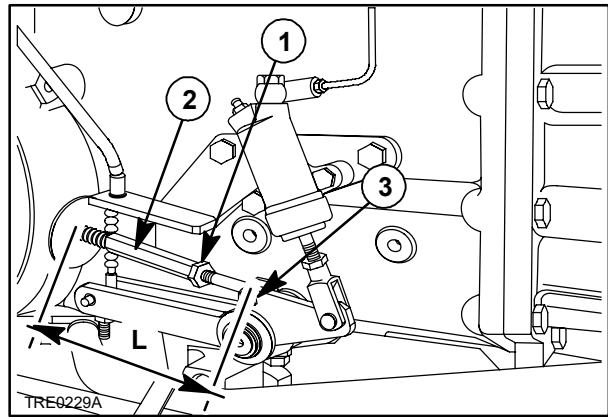
Proceed as follows.

1. Slacken the lock nut (1).
2. Tighten or slacken the adjusting screw (2) until the control lever is locked on the third notch.
3. Tighten the lock nut (1).

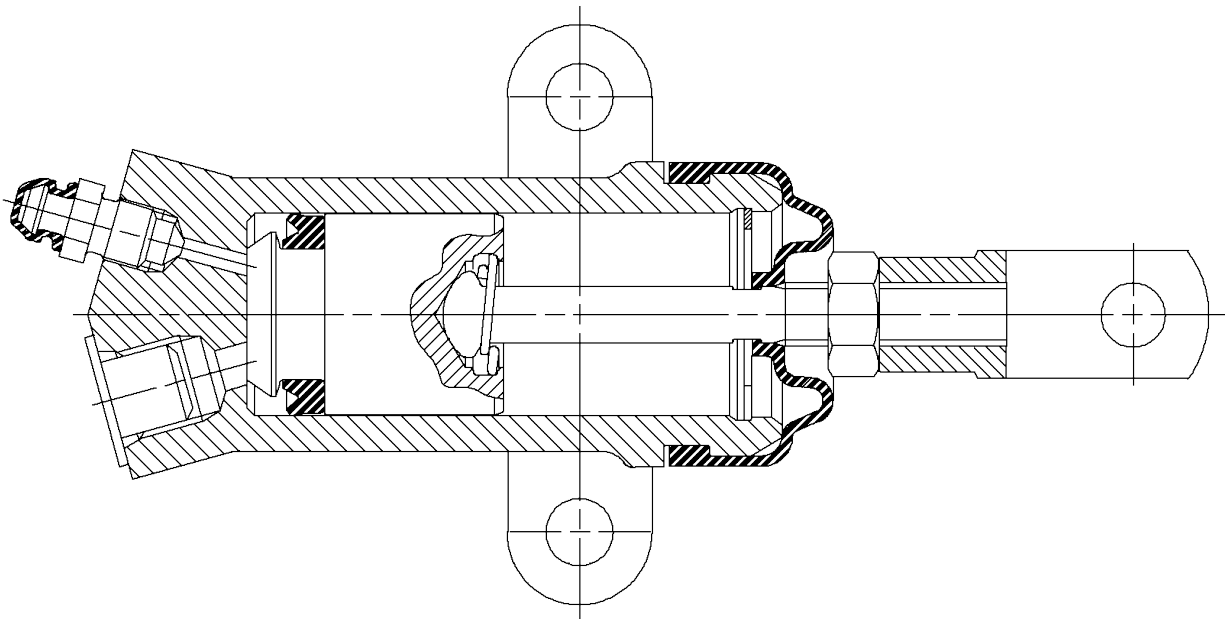


47

3. The length of the brake links must be 190mm $\pm$ 1mm. If adjustment is required, fully release the handbrake (lever down). Remove the connecting pin (3). Slacken the lock nuts (1) and turn the hexagon sleeves (2) until the length of brake links is 190 mm. Finally, tighten the lock nuts (1).

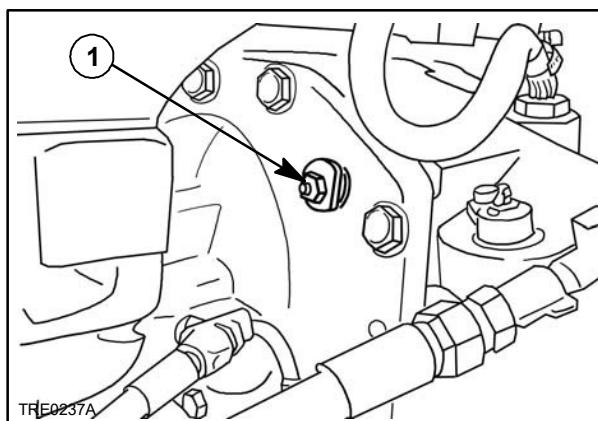


46



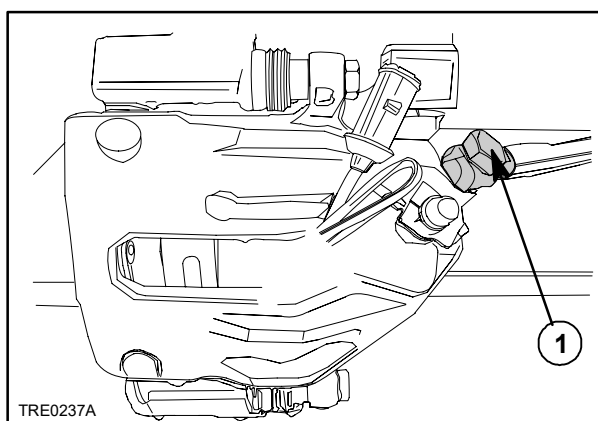
SECTIONAL VIEW OF SLAVE CYLINDER

12. Depress the **LH** and **RH** brake pedal, slowly and to the end of its travel, so that the oil is placed under pressure.
13. Keeping the pedals depressed, undo the bleed screw (1) by half a turn and allow the oil mixed with air bubbles to flow out.
14. Retighten the screw (1) and repeat the above operations until the oil that comes out is free of air bubbles.
15. When the operation has been completed, replenish the oil in the tank (1) fig. 39.



42

16. For JX60 & JX70 models front brake bleeding screw (1) is located on front wheel drive shaft that is shown on fig. 43.



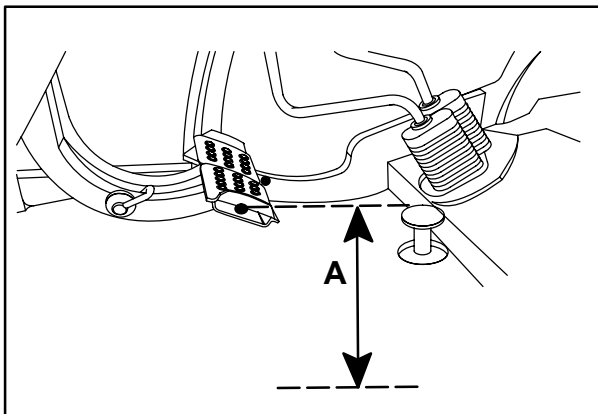
43

SERVICE BRAKE PEDALS

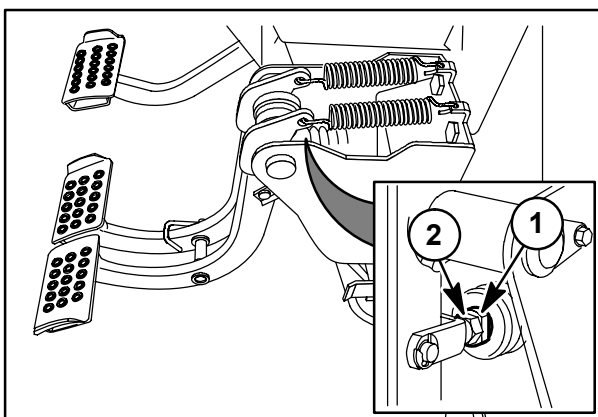
Adjusting height of service brake pedals

(Op. 33 120 08)

1. With the brake pedals connected to their respective forks and the pedal connecting pin removed, check that the height (A) from the centre of the pedals to the top of the carpet is: 162 mm for tractors fitted with cab or 205 mm for tractors without cab.
2. If adjustment is required, slacken the lock nuts (2) and tighten or slacken bolt (1) until the required height (A) is obtained. Lastly tighten the lock nuts.



44



45

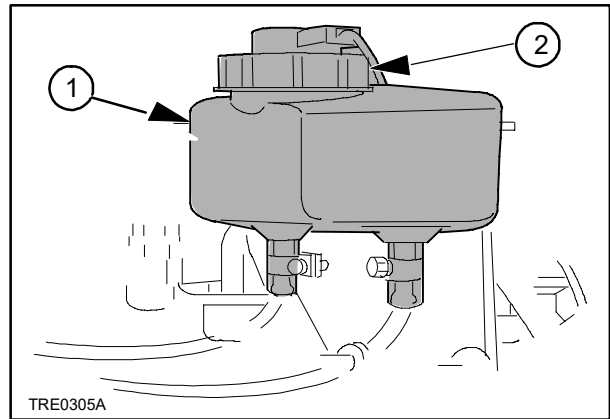
HYDRAULIC FRONT BRAKE SYSTEM (Optional)

Air bleeding (Op. 33 202 04)

Air must be bled whenever work is carried out on the front brake hydraulic system.

Proceed as follows.

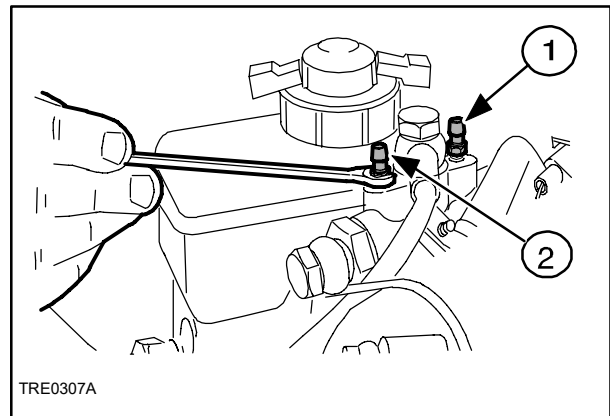
1. Thoroughly clean the external parts of the unit around the bleed screws (1) fig. 40, (1) fig. 42 and the hydraulic oil tank lid (1) fig. 39.
2. Make sure that the hydraulic oil tank (1) is filled up before and during the bleeding operations.



39

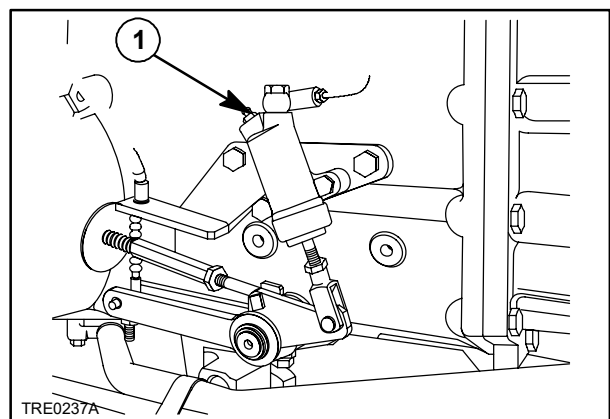
N.B. – Filter all drained oil before reusing.

3. Depress the LH brake pedal, **slowly and to the end of its travel**, so that the oil is placed under pressure.
4. Keeping the pedal depressed, undo the bleed screw (1) by half a turn and allow the oil mixed with air bubbles to flow out.
5. Retighten the screw (1) and repeat the above operations until the oil that comes out is free of air bubbles.
6. Depress the LH brake pedal again to place the circuit under pressure: this occurs when the travel of the pedal returns to normal.
7. Repeat the above operations for the RH brake pedal from the bleed screw (2).



40

8. Depress the **LH** and **RH** brake pedal, slowly and to the end of its travel, so that the oil is placed under pressure.
9. Keeping the pedals depressed, undo the bleed screw (1) on the RH brake slave cylinder by half a turn and allow the oil mixed with air bubbles to flow out.
10. Retighten the screw (1) and repeat the above operations until the oil that comes out is free of air bubbles.
11. When the operation has been completed, replenish the oil in the tank (1) fig. 39.

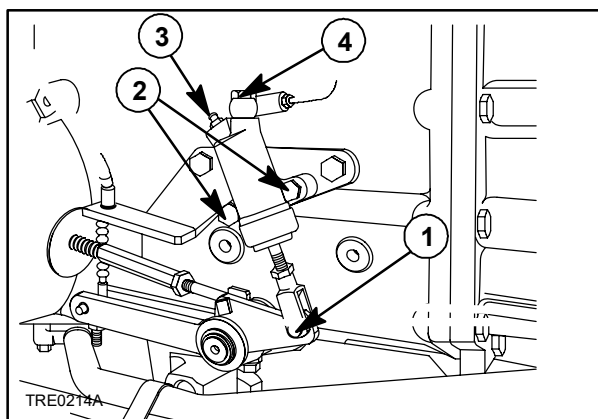


41

HYDRAULIC BRAKE SLAVE CYLINDER**Removal–Refitting (Op. 33 202 50)**

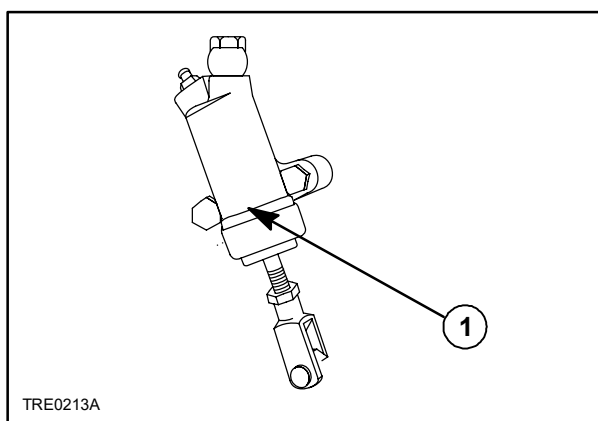
Proceed as follows to remove the hydraulic brake slave cylinder:

13. Remove the pin (1).
14. Remove the bolts securing the pump (2).
15. Take off the pipe connections (3) and (4).



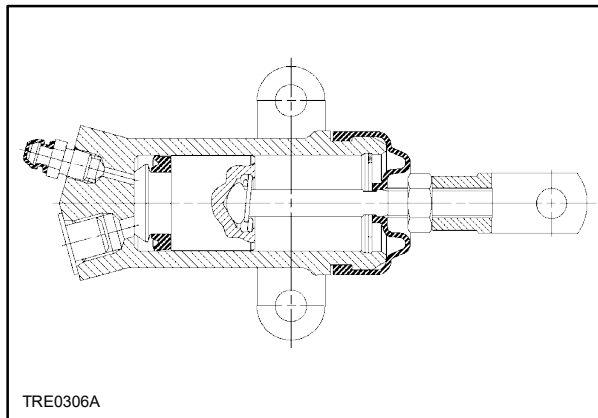
36

16. Withdraw the slave cylinder (1) from link.



37

17. Remove the front hydraulic pump internal parts.
Check the seals and piston.



38

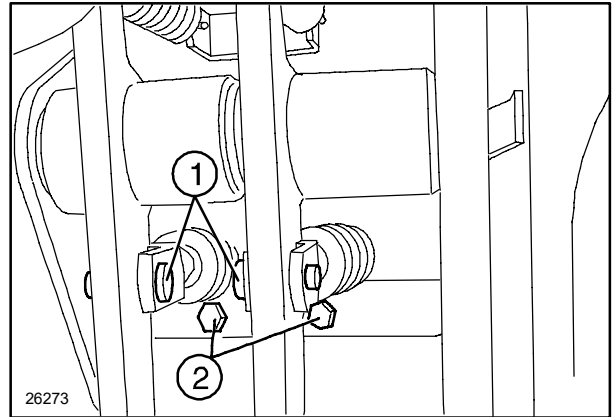
**WARNING**

Use appropriate tools to align the holes. NEVER USE YOUR FINGERS OR HANDS.

18. Refit the hydraulic brake slave cylinders as follows.

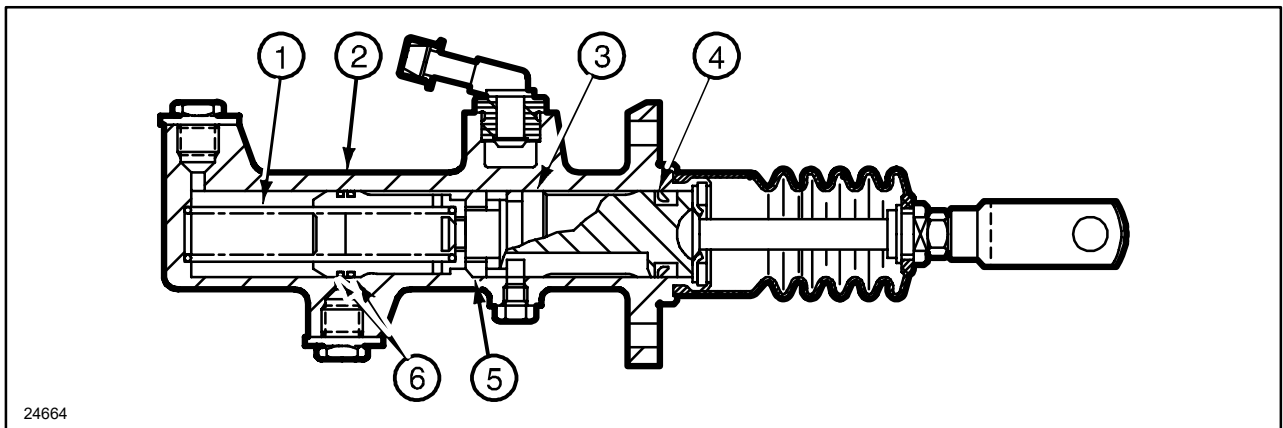
- Insert the master cylinder (1) from link.
- Fit the pin (1).
- Assembly the bolts securing the pump (2).
- Assembly the pipe connections (3) and (4).

10. Remove the retaining pins and withdraw the brake pump control fork articulation dowels (1).
11. Undo the bolts (2) that secure the brake control pumps to the cab and withdraw the pumps from the engine side.



34

⚠ WARNING ⚠
 Use appropriate tools to align the holes. NEVER USE YOUR FINGERS OR HANDS.



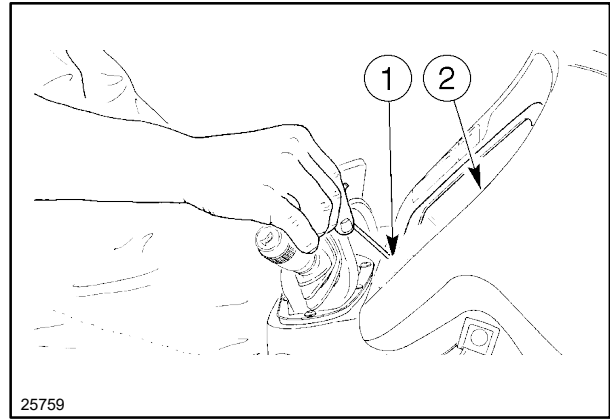
Sectional drawing of service brake control pump (Master cylinder)

35

- | | |
|--------------------|------------------|
| 1. Spring. | 4. Rear seal. |
| 2. Pump body. | 5. Central seal. |
| 3. Control piston. | 6. Front seal. |

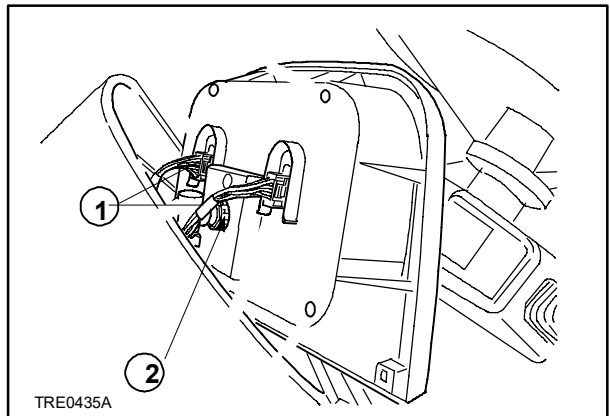
12. Refit the hydraulic brake control pump unit as follows.
 - Fit the pumps, secure them, then connect them to the control pedals.
 - Connect the control pipes and the tank and pressure sensor connections.
 - Connect the negative battery cable.
 - Carry out the following adjustment and bleed the air from the circuit, observing the points described on page 22.

5. Remove the four securing screws (1) from the instrument panel (2).



30

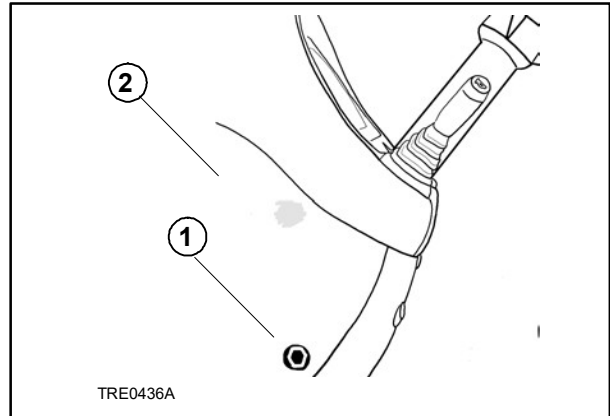
6. Disconnect the electrical leads (1) from the rear of the instrument panel. Unscrew the tachometer cable (2). Remove the instrument panel and store in a safe place.



31

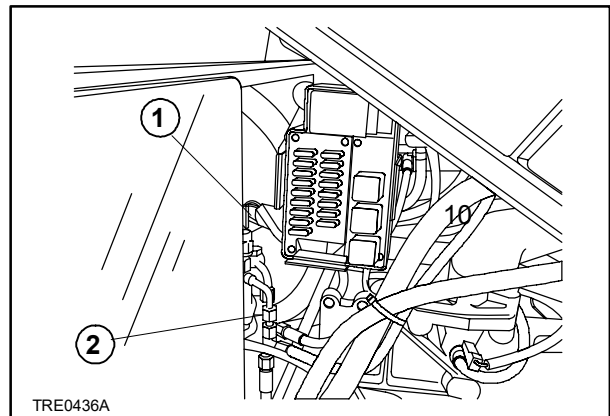
7. Unscrew the rear hood screws (1).

8. Take off the complete rear hood (2).



32

9. Remove the electrical connections from the pressure sensor (1) and remove the service brake control pipes (2).



33

HYDRAULIC FRONT BRAKE PUMP (OPTIONAL)

Removal – Installation (Operation. 33 202 50)



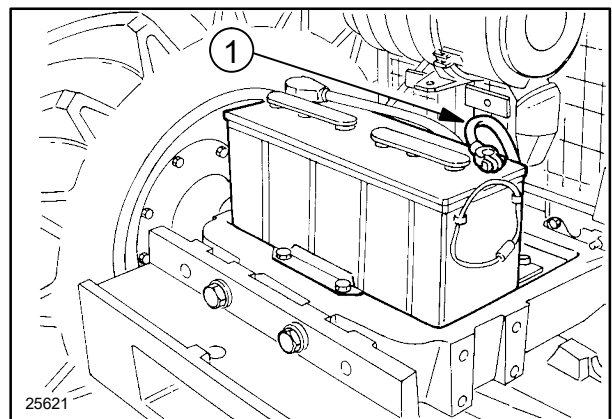
ATTENTION



Handle all parts carefully.
Do not insert fingers or hands between one part and another. Always wear the prescribed safety clothing, including protective glasses, gloves and shoes.

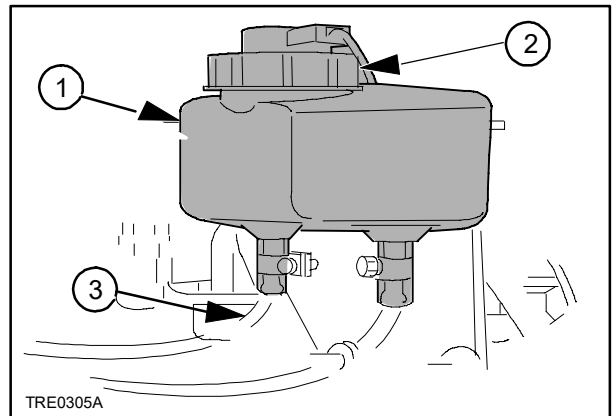
Proceed as follows to remove the hydraulic pump.

1. Disconnect the negative battery cable (1).
2. Chock the front wheels using suitable wheel stops.



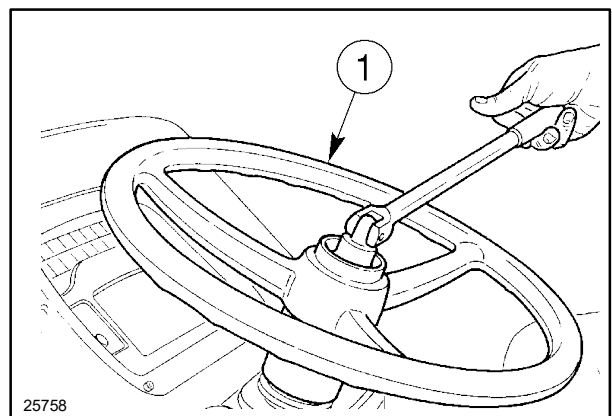
27

3. Disconnect the electrical connections from the plug (2) of the tank (1) and after retrieving the oil, remove the service brake control pipes (3).

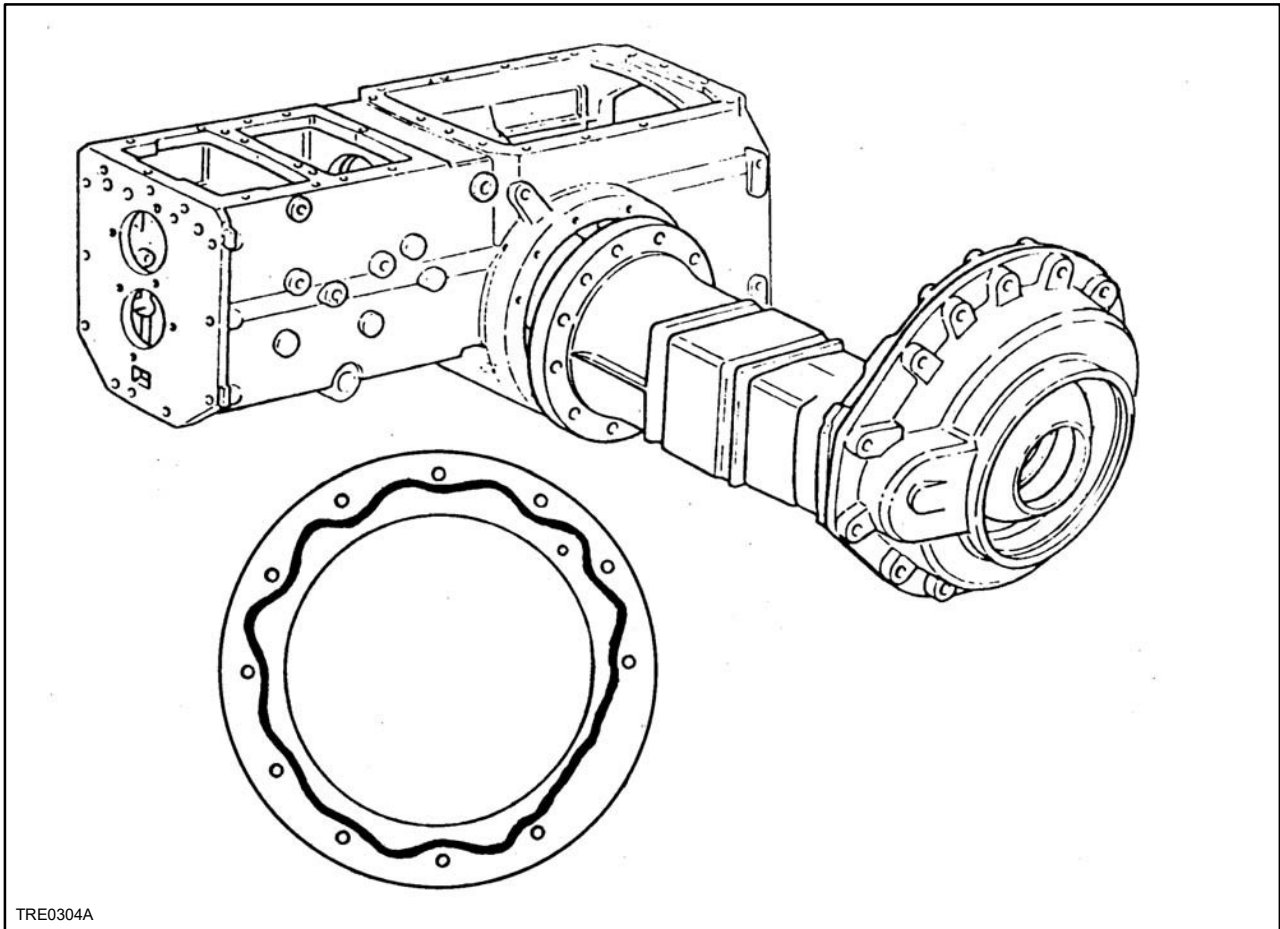


28

4. Remove the steering wheel (1) retaining nut and remove the steering wheel and hand throttle lever.



29



26

Diagram for application of sealing compound when fitting braking assembly between the final drive housing and the rear transmission box.

The types of sealing compound to be applied are listed on page 1 of Section 00.

13. Back off the link (1) and remove the complete brake unit.

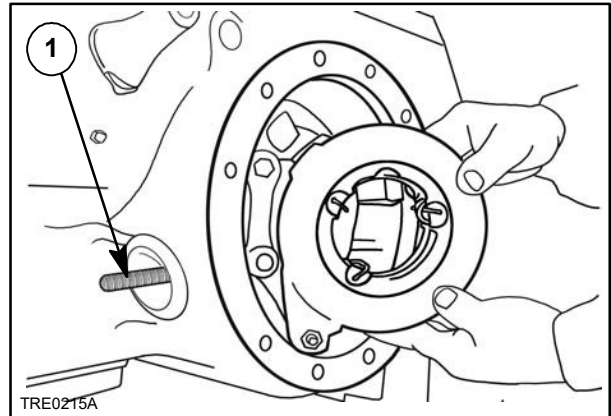
14. Check actuator and brake discs for wear.



ATTENTION



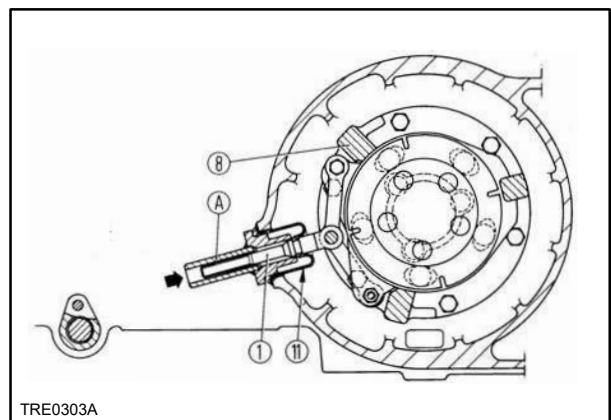
Always use appropriate tools to align fixing holes.
NEVER USE FINGERS OR HANDS.



24

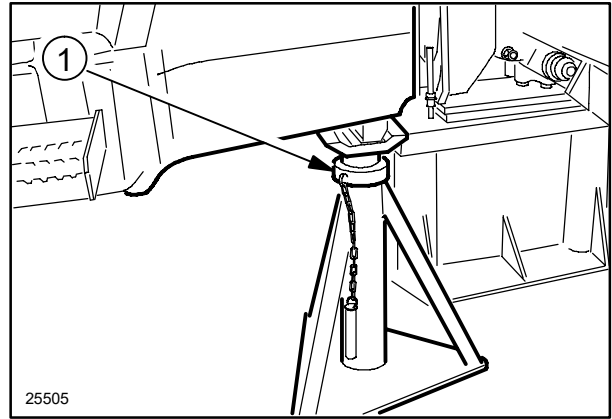
15. Refit the final drive box to the rear transmission box as follows:

- Refer to the illustrations on page 3 for the correct orientation of the various components.
- Before refitting the final drive box to the rear transmission box, thoroughly clean and degrease the mating surfaces and apply a strip of sealing compound of diameter about 2 mm as shown in the illustration on page 17.
- Apply the torque settings given on page 2.
- Using tool **380800022** (A) as shown, position boot (11) correctly on brake link (1). (see fig. 25)
- Fit the brake disc and spacers.
- Using tool **380000227** and a hydraulic lift, refit the final drive complete with axle shaft.
- Fit the rear cab mounting retaining bolts.
- Remove the piece of wood between the cab and the lift body.
- Tighten the bolt securing the cab to the rear LH support.
- Fit the LH wheel.
- Fit the stabiliser strut and the vertical rod.
- Remove the stands.
- Screw in the oil drain plug and refill.
- Connect the battery negative lead.



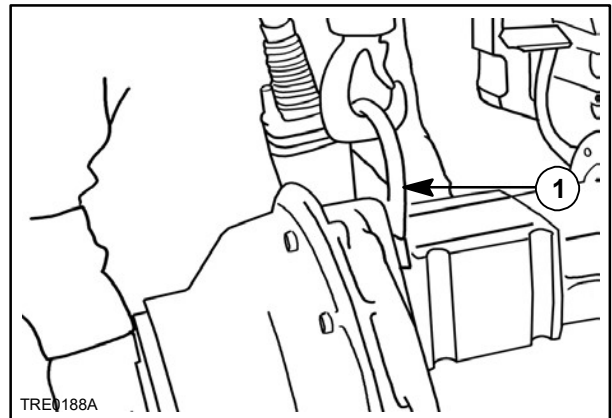
25

10. Position a stand (1) underneath the rear section of the fuel tank.



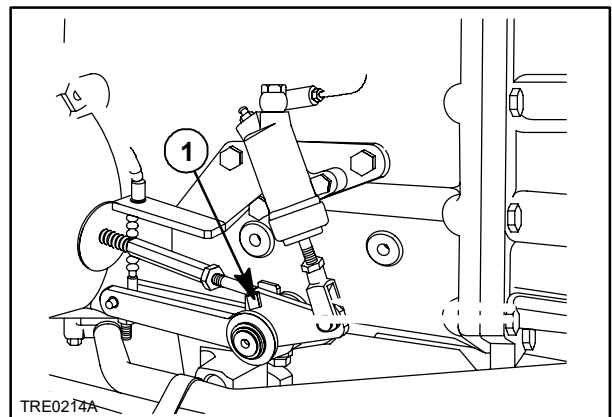
21

11. Fit lifting hooks (1) **380000227** onto the final drive box. Connect a hydraulic lift to the hooks, undo the retaining bolts and remove the LH final drive box from the transmission box.



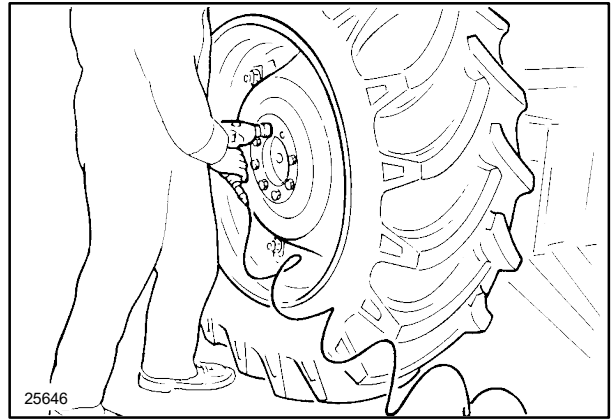
22

12. Remove the pin (1).



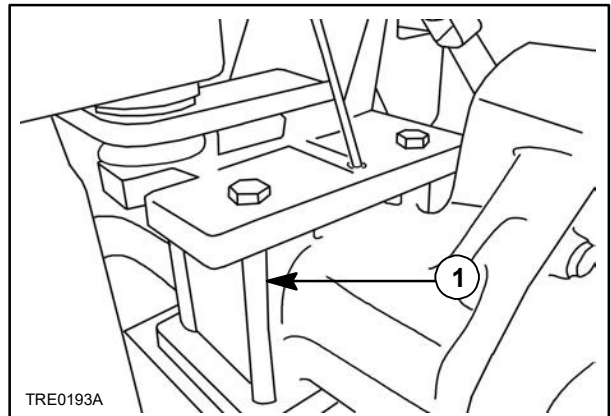
23

5. Undo the retaining bolts and remove the rear LH wheel.



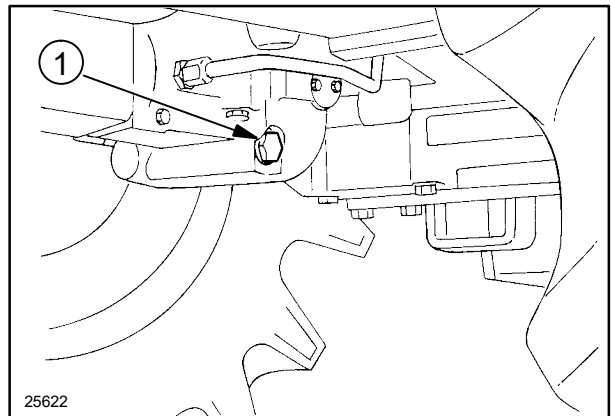
17

6. Undo the bolts (1) securing the cab to its mounting
7. Raise the cab slightly and place a suitable piece of wood between the hydraulic lift and the cab, taking care to avoid contact with pipes.



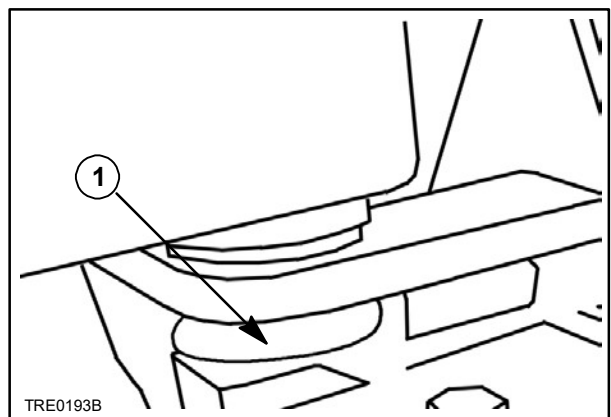
18

8. Remove the plug (1) and drain the oil from the rear transmission–gearbox casing.



19

9. Undo the bolts securing the cab to its mounting (1).



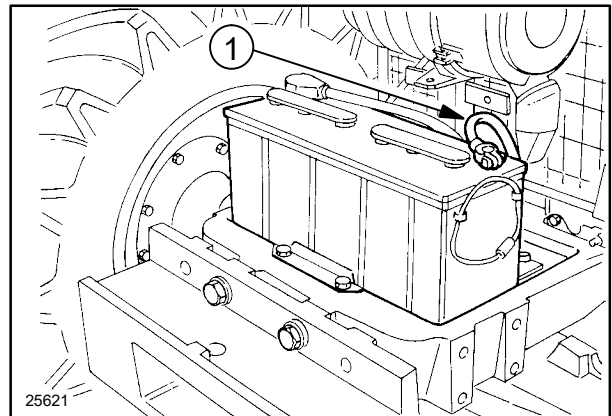
20

SERVICE BRAKE**Removal – Installation (Operation 33 202 60)****DANGER**

Lift and handle all heavy components using lifting equipment of adequate capacity. Make sure that the assemblies and parts are supported by appropriate tools and hooks. Check that no one is in the vicinity of the load to be lifted.

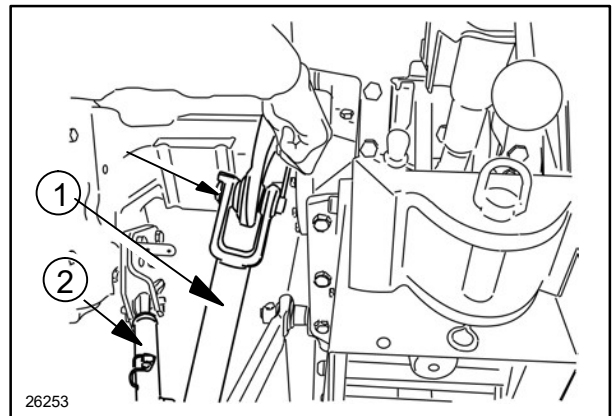
Proceed as follows to remove the final drive box.

1. Disconnect the negative battery cable (1).
2. Chock the front wheels using suitable wheel stops.



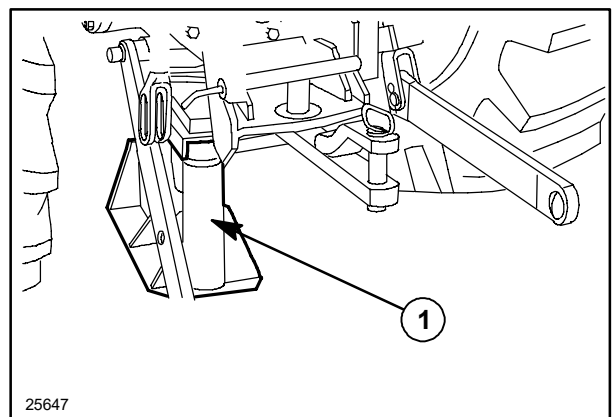
14

3. Remove the vertical rod (1) and the LH stabiliser strut (2).



15

4. Raise the rear section of the tractor and place a stand (1) beneath the tow bar support.



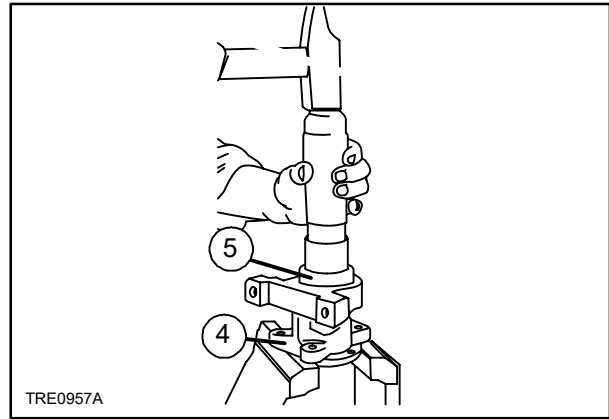
16

Bench overhaul (Operation 33–206)**DANGER**

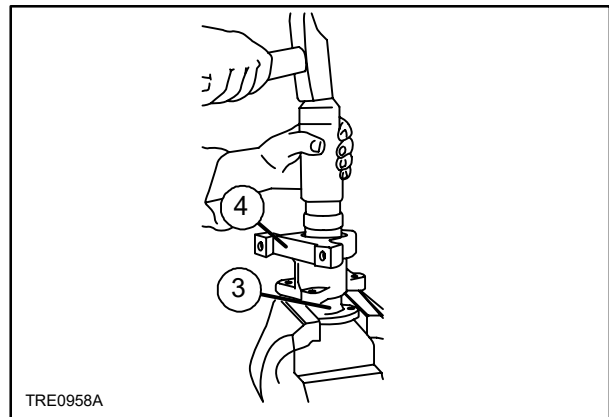
Always use suitable tools to align holes. NEVER USE FINGERS OR HANDS.

Reverse the removal operation sequence minding the following points:

1. Position the shaft/sleeve assy (3) Fig. 3, upright, introduce the support (4) fig. 12, followed by the washer (6) Fig. 3 in the bearing seat with the chamfered side facing outwards.
2. Insert bearing (5) fig. 3 on assembly (3) fig. 13 and bring into contact with seat using a suitable drift or press tool; lock with the retaining ring (9) fig. 3.
3. Clamp the carrier in a vice then, using a suitable drift or press tool, locate properly against washer (6) Fig. 3. Position washer (7) Fig. 3 with the chamfered side facing the bearing (5) and lock the assembly with the retaining ring (8) fig. 3.

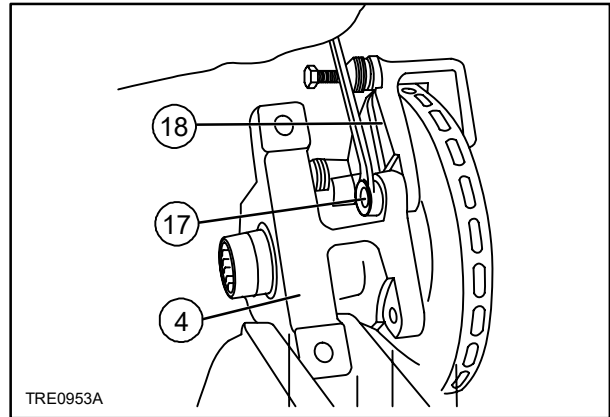


12



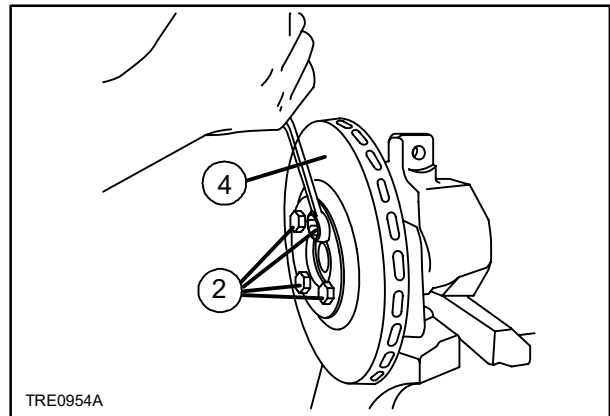
13

6. Take the two drive shafts out of the carrier and clamp the latter in a vice.



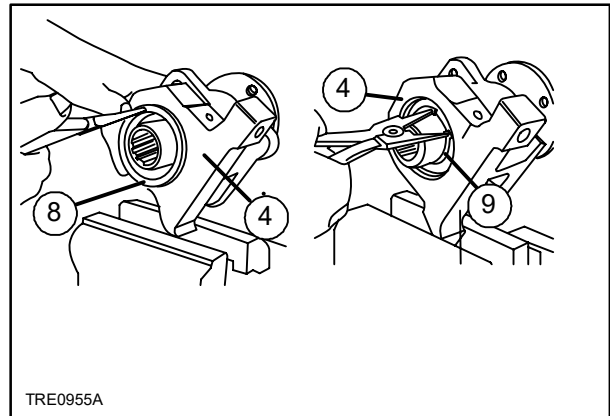
8

7. Unscrew the retaining bolts (17, fig. 8) of the calliper bracket and remove the bracket.
8. Unscrew the retaining bolts (2) of the brake disc and remove the disc (4).



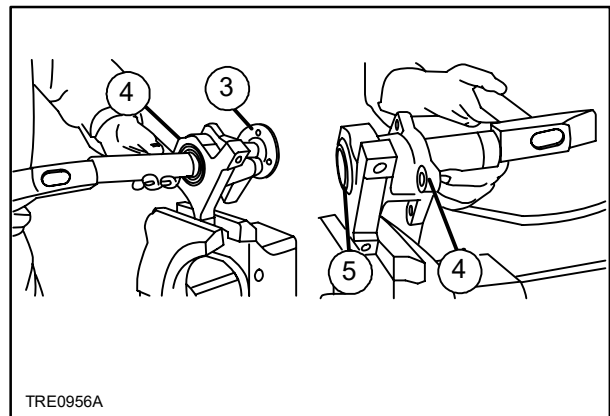
9

9. Take out retaining rings (8 and 9) from the support (4)



10

10. Using a suitable puller, remove the shaft/sleeve assembly (3) from the support (4).
11. Remove the bearing (5) using a suitable puller and take out the washer (6) Fig. 3.



11

FRONT BRAKE ASSEMBLY**MOD: JX60 AND JX70****Removal-Installation (Operation 33-206)****DANGER**

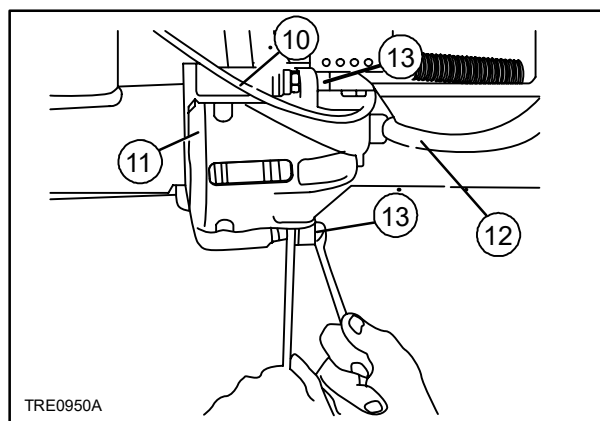
Lift and handle all heavy components using lifting equipment of adequate capacity.

Make sure that the units or parts are supported by appropriate harnesses and hooks. Check that no one is in the vicinity of the load to be lifted.

Proceed as follows to remove the unit:

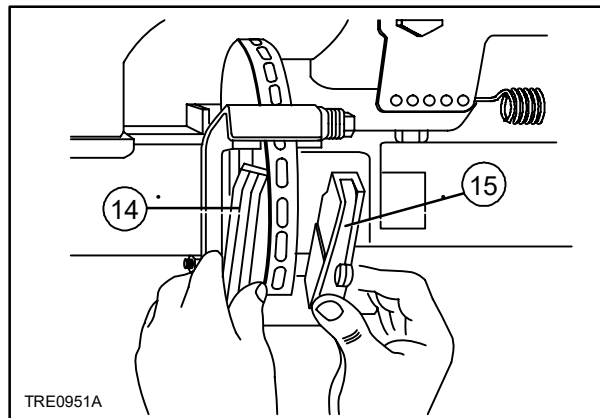
1. Apply the handbrake.
2. Unscrew the retaining bolts and remove the guards from the propeller shaft.

Note. – Should the caliper (11) not need any servicing, back off its retaining screws (13) and disconnect taking care not to uncouple the hose (12): rest on suitable stand or suspend by wire.



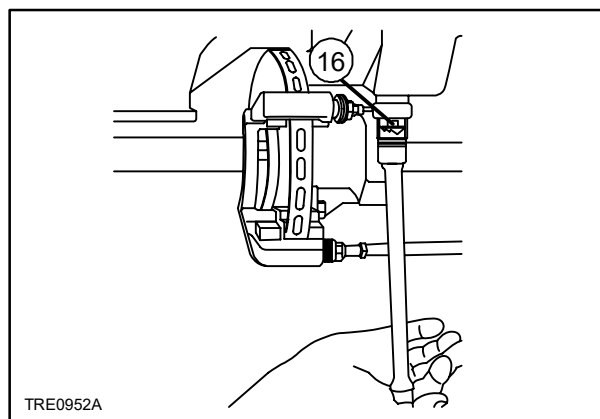
5

3. Disconnect wire (10) fig. 5 of the brake pad wear warning indicator and remove the pads (14 and 15) fig. 6.



6

4. Remove the front sleeve rear retaining ring and back off the two screws (16) retaining the brake sleeve assembly carrier.
5. Slide the front sleeve along the drive shaft and remove the complete assembly (shaft and brake/bearing carrier).



7

TOOLS

WARNING – The operations described in this section must be performed only with the **ESSENTIAL** equipment marked with **(X)**.

To operate safely and achieve best results however, while saving time and effort, essential equipment must be used in conjunction with the special tools recommended below, and tools which you must make yourself and for which you will find the design in this manual.

List of special tools necessary for the various operations described in this section.

X 380000822 Driver for boot installation.

380000227 Lifting hook.

BRAKE TROUBLESHOOTING

Problems	Possible causes	Remedies
Braking ineffectual.	1. Friction material on brake discs worn.	Replace the brake discs.
Unbalanced braking.	1. Incorrect tyre pressure. 2. Friction material on one of the brake discs worn.	Inflate the tyres to the correct pressure. Replace the discs.
Braking noisy.	1. Friction material on brake discs worn.	Replace the discs.
Parking brake does not lock.	1. Brake discs worn.	Replace the brake discs.
Brakes locked on when the parking brake is disengaged.	1. Brake discs seized on brake discs.	Release and replace damaged parts.

DESCRIPTION AND OPERATION

SERVICE BRAKES

The service brakes are hydraulic with oil bath discs.

The two control pumps (one for each pedal) are housed in the front section of the cab and are connected to their respective pedals by means of two rods.

These pumps can be actuated either independently or together. If actuated together, the pedals are connected by a pin.

A connecting pipe between the two pumps ensures balanced braking even when the brake discs are not equally worn.

The two control pumps are fed from a single tank located above the pumps.

Refer to the illustrations on page 5. The service brakes are slave cylinder operated. When the left-hand brake pedal (fig. a) is depressed, the master cylinder (MS) sends the oil to the slave cylinder (SL). The brake links (1) move as indicated by the arrows, by the help of slave cylinder (SL) this

causing actuator discs to turn, ball (3) in the tapered seats to force the discs apart as shown in detail (c).

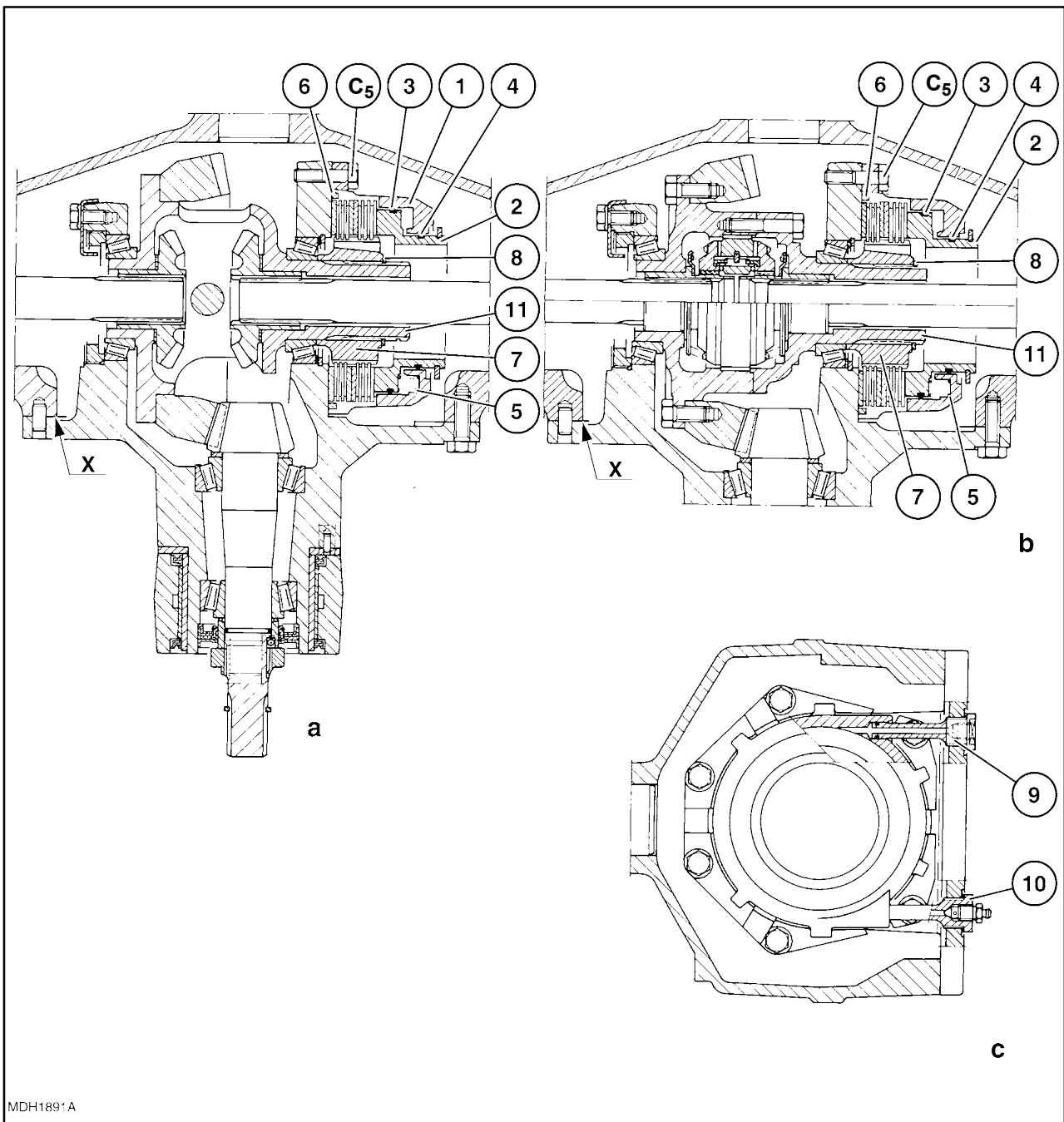
As a result, two simultaneous actions compress the brake discs against the differential support (8) and the back up discs, immediately upon releasing the pedal spring (7), pull the actuator (4) back into the rest position (figure b and detail d) and as a result the discs are released. The action is similar when the right-hand brake pedal is pressed (Rd).

The brake discs (one for each rear wheel) are positioned between the rear transmission box and the lateral final drive box and are splined onto the differential output half-shafts.

PARKING BRAKE

Refer to the illustrations on page 5. When the hand brake lever (L_m) is pulled, the control cable (14) pulls the control lever (13), at the direction of arrow. Then the brake links (1) acts on the brake discs.

FRONT BRAKE (MODELS JX80, JX90 and JX95)



MDH1891A

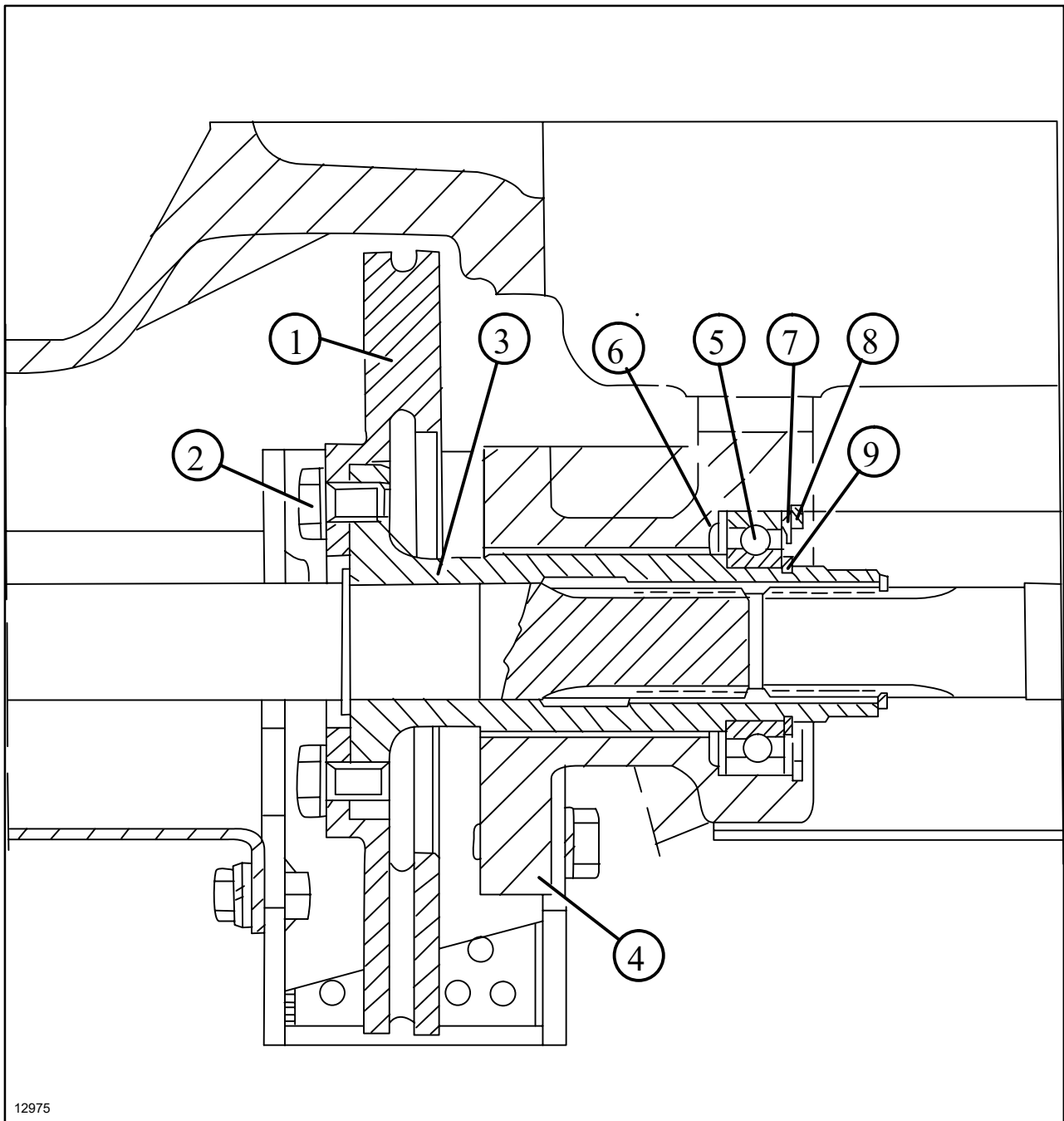
4

View of brake mounted in front axle.

- | | |
|--|--------------------------------|
| a. Cross-sectional view of axle with differential. | 4. Seal. |
| b. Cross-sectional view of axle with NO-SPIN assembly. | 5. Piston contact spring. |
| c. View of oil delivery union and brake bleed. | 6. Centring ring. |
| C ₅ Brake box retaining bolt. | 7. Gear. |
| 1. Brake box. | 8. Circlip. |
| 2. Brake drive piston. | 9. Drive oil inlet pipe union. |
| 3. Seal. | 10. Plug pipe with breather. |
| | 11. Splined shaft. |

Note. – When mounting apply sealing compound to surfaces X.

FRONT LIVE AXLE DRIVE SHAFT BRAKE (JX60 & JX70 MODELS)



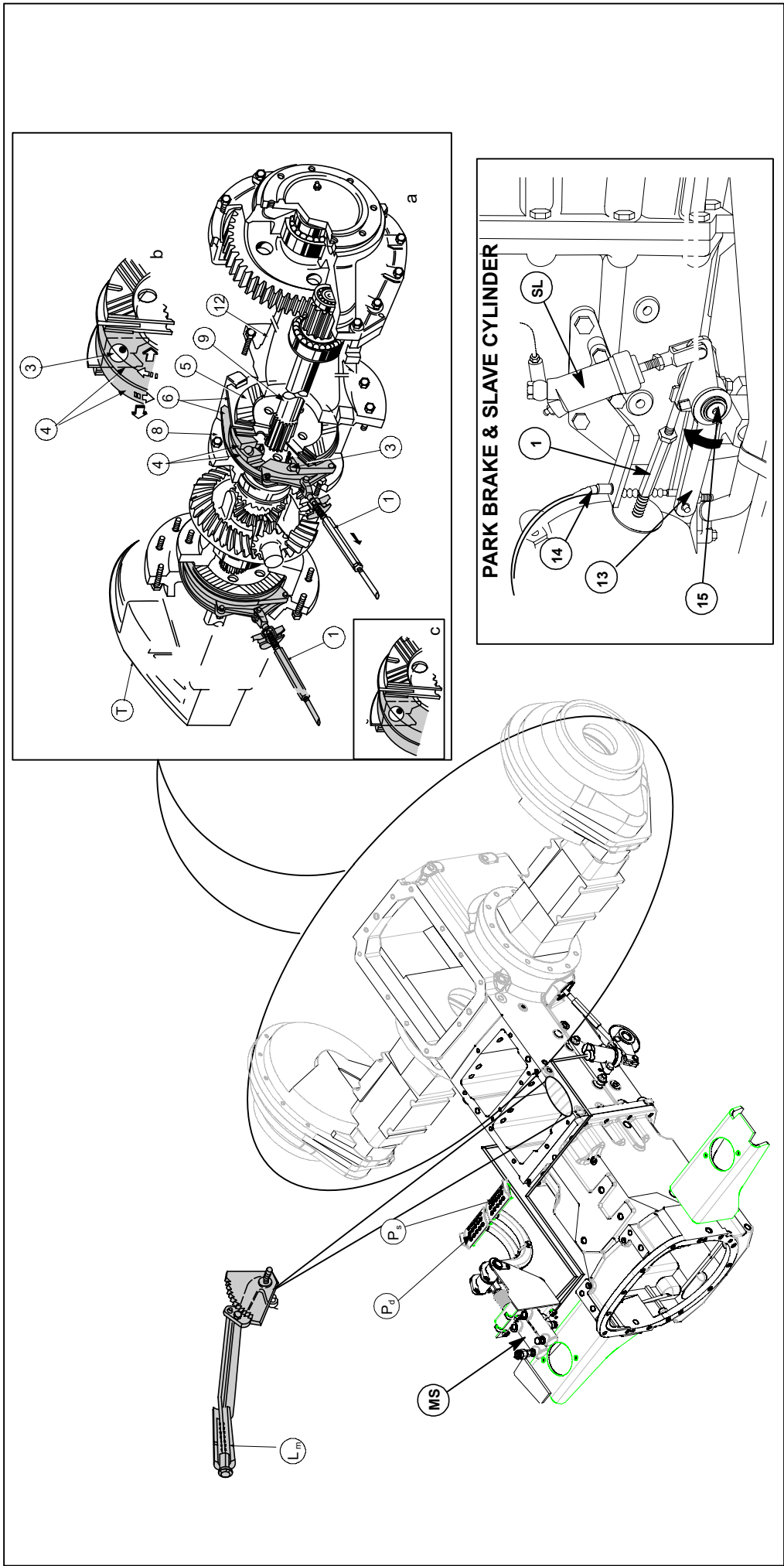
12975

3

Section through the brake fitted on drive shaft to front live axle

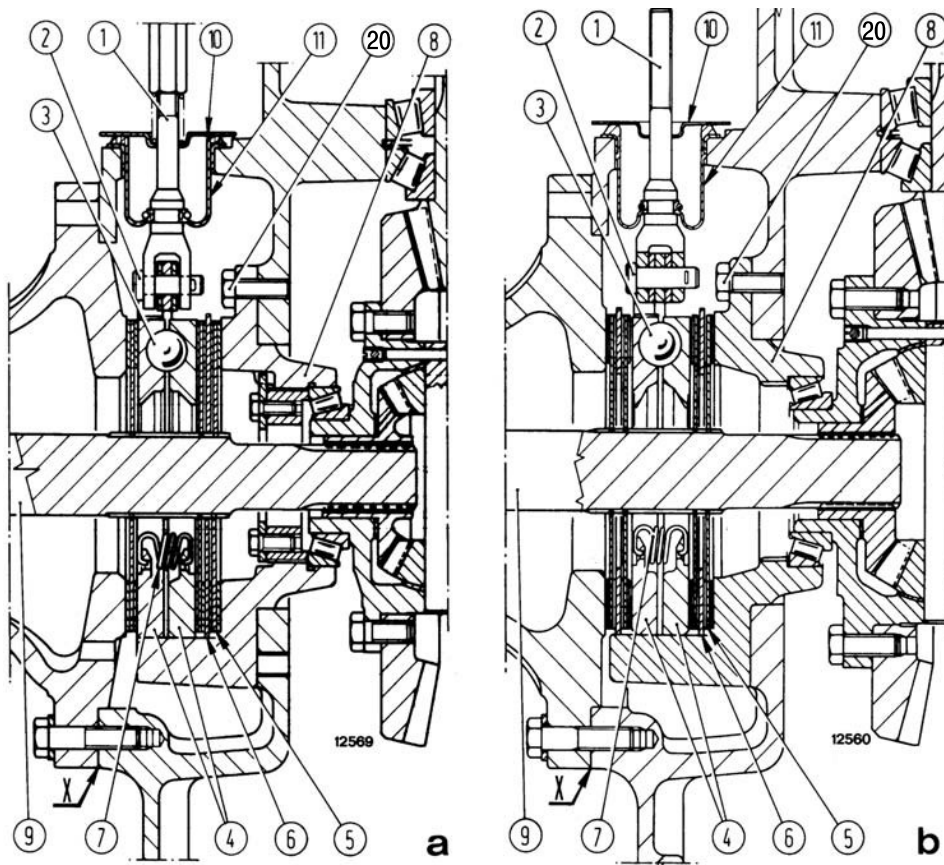
- | | |
|------------------------------|--------------------------|
| 1. Self-centering brake disc | 6. Front washer. |
| 2. Disc retaining screw | 7. Rear washer. |
| 3. Shaft/sleeve assembly | 8. Outer retaining ring. |
| 4. Carrier. | 9. Inner retaining ring |
| 5. Bearing. | |

BRAKES



View of service and park brake controls

- | | | |
|--|----------------------------|-------------------------------|
| a. R.H. brake pedal in rest position and L.H. brake applied. | 4. Brake actuator. | 9. Axle shaft. |
| b. Brakes in rest position. | 5. Brakes discs. | 12. Final drive housing. |
| c. Parking brake hand lever. | 6. Back-up discs. | 13. Park brake control lever. |
| Lm. Parking brake hand lever. | 7. Actuator return spring. | 14. Park brake control cable. |
| M. Brake pedal return springs. | 8. Differential support. | 15. Brake pivoting shaft. |
| Pd. R.H. brake pedal. | | |
| P_a. Slave cylinder | | |
| P_s. Master cylinder | | |
| SL. Parking brake link. | | |
| 1. Brake links. | | |
| 3. Actuator ball. | | |



TRE0301A

2

Sectional drawing of service and parking brakes

- a. models JX60 and JX70.
- b. models JX80, JX90 and JX95.
- 1. Brake link.
- 2. Pin.
- 3. Ball.
- 4. Brake actuator.
- 5. Brake discs.

- 6. Back-up discs
- 7. Actuator return spring.
- 8. Differential support.
- 9. Axle shaft.
- 10. Boot cover plate.
- 11. Boot.
- 20. Differential support retaining bolt.

Note. – When mounting apply sealing compound to surfaces X as shown on page 18.

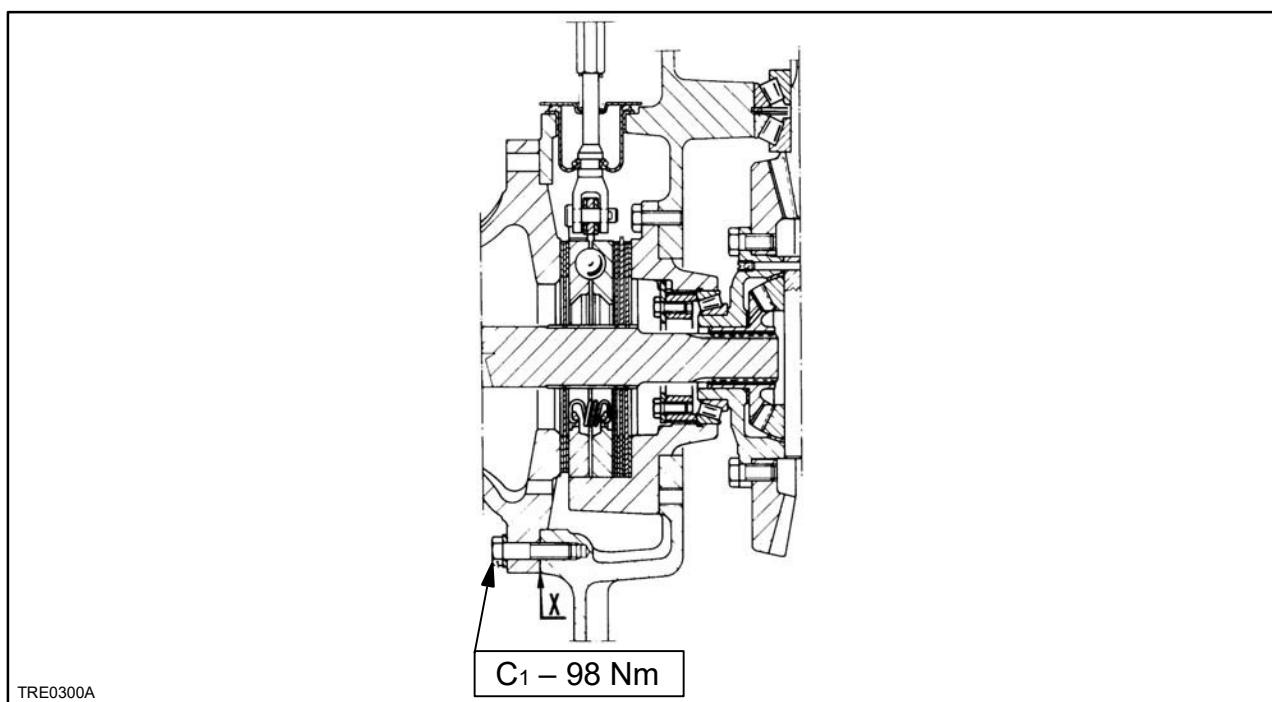
MAIN SPECIFICATION

(cont.)

Thickness of mobile sectors for independent parking brake:		
– lateral sectors	mm (in.)	3.1 – 3.4 (0.122 – 0.1339)
– intermediate sectors	mm (in.)	4.2 – 4.5 (0.1653 – 0.1772)
Front brakes (with 4WD models – on request) Hydrostatic control Hydraulic pump		with 2 control pumps operated independently by means of the brake pedals
Adjusting the control pedals		see page 24
Bleeding air from the front brake circuits (Optional)		see page 23

TORQUE SETTINGS

PARTS TO BE TIGHTENED	Thread	Tightening torque	
		Nm	ft lb
Nuts securing final drive box to transmission box (C ₁)	M 12 x 1.25	98	72.281
Brake box retaining bolt (C5, page 8)	M 10 x 1.25	70	51.6293



SECTION 33 – BRAKING SYSTEM

Chapter 1 – Braking system

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33 000 – MAIN SPECIFICATION – TORQUE SETTINGS – TOOLS – SECTIONAL DRAWINGS – DESCRIPTION AND OPERATION – TROUBLESHOOTING MAIN SPECIFICATION		

Type:		
– service brake		with oil bath discs acting on differential half-shafts
– parking brake		with oil bath discs acting on differential half-shafts with oil bath discs acting on the bevel pinion shaft by means of a gear (Optional)
Control:		
– service brake		mechanical, with independent pedals (connected by means of a pin)
– parking brake		mechanical, by means of a hand lever
Disc material for service brake		organic agglomerate
Disc material for parking brake		steel
Mobile sector material for parking brake		sintered or organic agglomerate
Disc thickness:		
– service brakes	mm (in.)	4 (0.1575)
Discs for service brake:		
– JX60 and JX70	nº	3
– JX80, JX90 and JX95	nº	4

(see over)