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TA30 Articulated Dumptruck Maintenance Manual



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Service Information Alert

DATE: April 1994

B168

MODEL: General

SUBJECT: VITON 'O' RINGS AND SEALS (FLUORO-ELASTOMERS) - SAFETY HAZARDS

PURPOSE:

To advise potentially hazardous condition.

DETAIL:

It has been brought to our attention that 'Viton' material used in manufacture of oil seals and 'O' rings, produces a highly corrosive acid (Hydrofluoric) when subjected to temperatures above 315° C.

The resulting contamination can have extreme consequences on human tissue since it is almost impossible to remove after contact.

We therefore recommend the following procedure when it is necessary to inspect any equipment that has been subjected to a high temperature i.e. fire.

- a. Visually inspect for any gaskets or seals which have suffered from heat; they will appear black and sticky.
- b. If this is affirmed - **Do Not Touch**
- c. Make enquiries to ascertain the material composition. Any Fluoro-elastomer (Viton, Fluorel or Tecnoflon) should be considered dangerous but natural rubber and nitrile are non-hazardous.
- d. If Fluoro-elastomer seals have been used, then the affected area **MUST** be decontaminated before undertaking further work.
- e. Disposable Heavy Duty Gloves (Neoprene) **MUST** be worn and the affected area decontaminated by washing thoroughly with Limewater (Calcium Hydroxide solution).
- f. Any cloths, residue and gloves used **MUST** be safely discarded after use.

Note: Burning of the discarded items is **NOT RECOMMENDED**, except in an approved incineration process where the gaseous products are treated by alkaline scrubbing.

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NOTICE DE SÉCURITÉ IMPORTANTE

Un entretien et des réparations adéquats sont importants pour la sécurité, un fonctionnement fiable de tous les véhicules à moteur. Les procédures d'entretien recommandées et décrites dans cette publication sont des méthodes efficaces permettant l'exécution d'opérations d'entretien. Certaines de ces opérations d'entretien nécessitent l'utilisation d'outils conçus tout particulièrement à cette fin. Les outils spéciaux doivent être utilisés lorsqu'ils sont recommandés.

Il est important de remarquer que cette publication comprend différents AVERTISSEMENTS et NOTES qui doivent être lus avec précaution afin de minimiser le risque de blessures du personnel ou de mise en pratique de méthodes de service inadéquates risquant d'endommager le véhicule ou de le rendre peu sûr. Il est également important de comprendre que ces AVERTISSEMENTS et NOTES ne sont pas exhaustifs. Il n'est pas possible de connaître, d'évaluer et de faire part au personnel de TOUTES les méthodes imaginables en fonction desquelles l'entretien peut être effectué ou de tous les risques possibles en résultant. Par conséquent, une évaluation aussi large n'a pas été prise en considération. Donc, quiconque utilise une procédure d'entretien ou un outil qui n'est pas recommandé doit tout d'abord s'assurer que ni sa sécurité et ni la sécurité du véhicule ne sera remise en cause par la méthode d'entretien qu'il/elle sélectionne.

Deux types d'en-tête sont utilisées dans ce manuel pour attirer votre attention.

1.  **AVERTISSEMENT** - Ce symbole est utilisé lorsqu'une procédure de fonctionnement, pratique, etc., qui, si elle n'est pas observée correctement, risque d'entraîner des blessures corporelles voire la mort. Recherche ce symbole pour indiquer les précautions de sécurité importantes. Il signifie - **ATTENTION! SOYEZ PRUDENT! VOTRE SECURITE EST EN JEU!**
2. **Note** - Ce symbole est utilisé lorsqu'une procédure de fonctionnement, méthode, etc., qui, si elle n'est pas observée strictement, risque d'entraîner des dommages ou une destruction de l'équipement.



AVERTISSEMENT

N'utilisez jamais des pièces qui sont altérées, modifiées ou affaiblies lors du fonctionnement. Ceci peut sérieusement remettre en cause l'intégrité de la machine et provoquer des dommages de l'équipement ou de graves blessures corporelles.

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GENERAL INFORMATION - Technical Data

Section 000-0000

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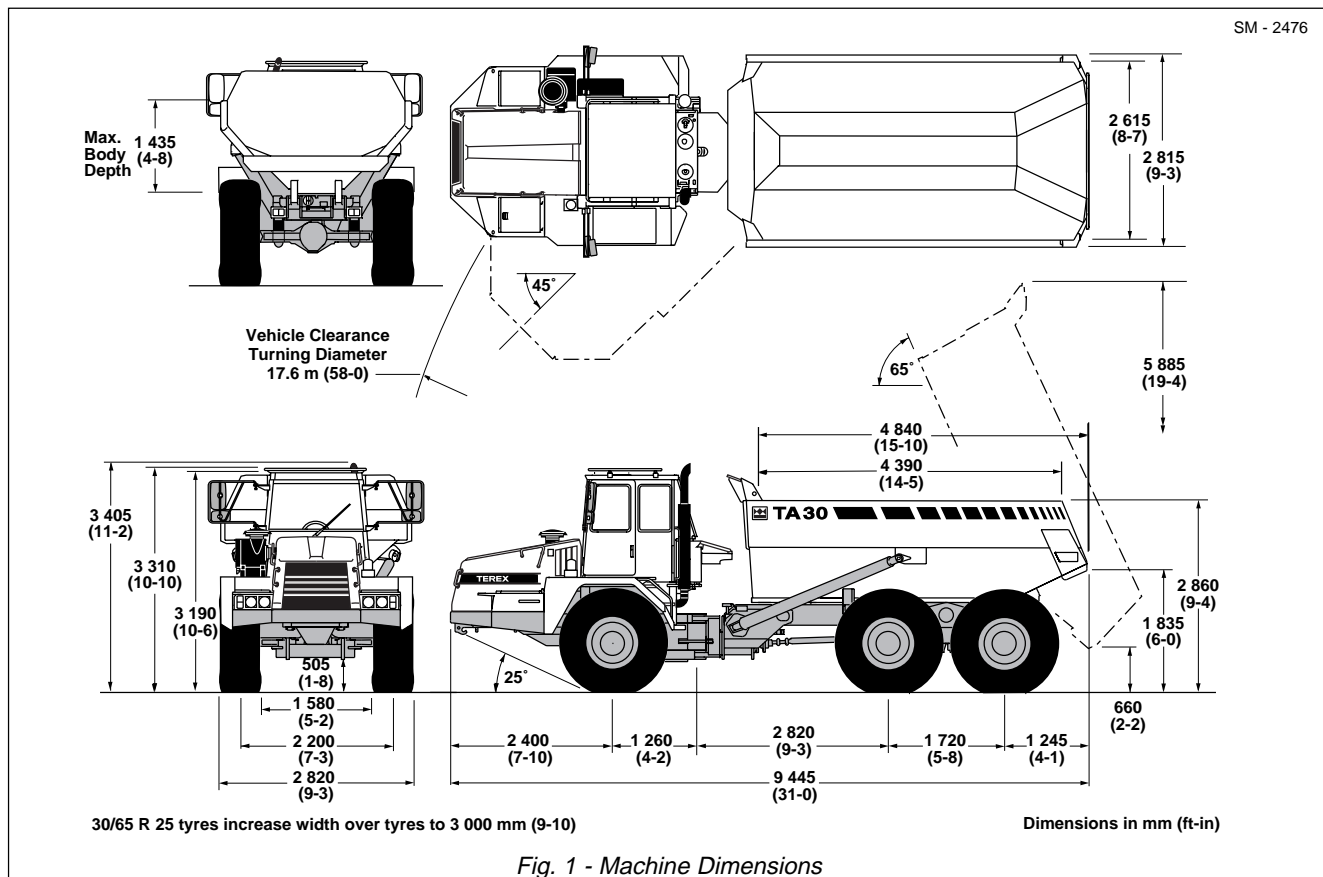


Fig. 1 - Machine Dimensions

ENGINE

Make/Model Cummins MTA11-C300
 Type Four cycle, low emission, direct injection diesel, water-cooled, turbocharged and aftercooled.
 Gross power at 2 100 rev/min 224 kW (300 hp, 304 PS)
 Net power at 2 100 rev/min 214 kW (287 hp, 291 PS)

Note: Gross power rated to SAE J1995 Jun 90. Engine emission meets USA EPA/CARB MOH 40 CFR 89 and EU NRMM (non-road mobile machinery) directive.

Maximum Torque ... 1 376 Nm (1 015 lbf ft) at 1 300 rev/min
 Number of cylinders/configuration 6, in line
 Bore x Stroke 125 x 147 mm (4.92 x 5.79 in)
 Total Displacement 10.8 litres (660 in³)
 Air cleaner Dry type, double element
 Starting Electric
 Maximum Speed (No load) 2 450 rev/min
 Maximum Speed (Full load) 2 100 rev/min
 Idle Speed 675/750 rev/min
 Safe Operating Angle 43°/94% Grade

TRANSMISSION

Make/Model ZF 6WG 260 II Automatic with manual override. The transmission assembly consists of a torque converter close-coupled to a countershaft-type gearbox with integral output transfer gearing. Automatic shifting throughout the range, with kickdown feature. Lockup action in all forward gears. A torque proportioning output differential transmits drive permanently to front and rear axles. This differential may be locked by the driver for use in difficult traction conditions. Standard integral hydraulic retarder which is automatically operated should the engine

overspeed. Blocked filter indicator and filter bypass system provide valve block with additional protection from unfiltered oil.

Pressures:

Main 16 + 2 bar (232 + 30 lbf/in²)
 Lockup (Wk) 14 ± 1 bar (190 ± 15 lbf/in²)
 Converter 'IN' 7.6 bar (110 lbf/in²) at 2 300 rev/min
 Converter 'OUT' 4.8 bar (70 lbf/in²) at 2 300 rev/min
 Converter Relief Valve 8.5 bar (123 lbf/in²)
 Retarder 5.5 bar (80 lbf/in²)

Temperatures:

Normal 80° - 110° C (176° - 230° F)
 Maximum 120° C (248° F)

Stall Speed 1 655 ± 50 rev/min

Ratios:

Torque Converter 1.84:1
 Transmission Refer to table

Forward						
Gear	1	2	3	4	5	6
Ratio	5.35	3.45	2.21	1.42	0.97	0.62
km/h	5.0	8.0	12.5	19.5	29.0	45.0
mile/h	3.0	5.0	8.0	12.0	18.0	28.0
Reverse						
Gear	1	2	3			
Ratio	5.35	2.21	0.97			
km/h	5.0	12.5	29.0			
mile/h	3.0	8.0	18.0			

General Information - Technical Data

Section 000-0000

AXLES

Three axles in permanent all-wheel drive with differential coupling between each axle to prevent driveline wind-up. Heavy duty axles with fully-floating axle shafts and outboard planetary reduction gearing.

Automatic limited slip differentials in each axle. Centre axle incorporates a through-drive differential to transmit drive to the rear axle. Locking of this differential is actuated simultaneously with the transmission output differential lock.

Ratios:
Differential 3.44:1
Planetary 6.35:1
Total Reduction 21.85:1

SUSPENSION

Front: Axle is carried on the leading arms of a sub-frame pivoting on the main frame. Suspension is by flexible air bellows with four heavy duty hydraulic dampers.

Axle Vertical Travel 127 mm (5 in)

Rear: Each axle is coupled to the frame by three rubber-bushed links with lateral restraint by transverse link. Pivoting inter-axle balance beams equalise load on each axle. Suspension movement is cushioned by rubber/metal laminated compression units between each axle and underside of balance beam ends.

Axle Vertical Travel ± 130 mm (5.12 in)
Axle Oscillation $\pm 12^\circ$

BRAKES

Air assisted hydraulic dry disc on each wheel with two heavy-duty callipers per disc at the front and a single heavy-duty calliper per disc at the rear. Independent circuits for front and rear brake systems. Overstroke actuates warning light. Brake system meets ISO 3450, SAE J1473.

Air System Pressure 7.6 bar (110 lbf/in²)
Total Air Reservoir Capacity 55 litres (3 356 in³)
Hydraulic Brake Fluid Capacity 2.64 litres (0.68 US gal)

Parking: Spring-applied, air-released disc on rear driveline.

Emergency: Emergency brake control actuates the service brakes. Automatic application of service brakes should pressure fall in the brake air system.

Retardation: Hydraulic retarder integral with transmission.

WHEELS AND TYRES

Wheels: 5-piece earthmover rims with 12 stud fixing
Size:

Standard 25 x 19.50 in for 23.5 R25** tyres
Optional 25 x 22.00 in for 30/65 R25** tyres

Tyres:

Standard 23.5 R25**
Optional 30/65 R25**

Inflation Pressures (Bridgestone):

	Front	Rear
23.5 R25**	4.0 bar (58 lbf/in ²)	4.8 bar (69 lbf/in ²)
30/65 R25**	4.3 bar (62 lbf/in ²)	4.3 bar (62 lbf/in ²)

Note: Tyre pressures should be regarded as nominal only. It is recommended that for tyres both listed and unlisted, the user should consult the tyre manufacturer and evaluate all job conditions in order to make the proper selection.

HYDRAULIC SYSTEM

Steering and Body Hoist

The steering and body hoist systems are supplied with oil from a common tank by the main hydraulic pump. Gear pump driven from power takeoff on transmission. System components are protected by full flow filtration on the return line.

Pump:

Type Gear
Capacity at 2 300 rev/min 4.49 litre/s (71 US gal/min)

Steering System

Hydrostatic power steering by two single-stage, double-acting, cushioned steering cylinders. Emergency steering pressure is provided by a ground driven pump mounted on the rear of the transmission. An audible alarm and warning light indicates should the emergency system activate. Conforms to ISO 5010, SAE J53.

System Pressure 241 bar (3 500 lbf/in²)
Steering Angle to either side 45°
Lock to Lock Turns, steering wheel 4
Vehicle Clearance Circle (SAE) 17.6 m (58 ft)

Body Hoist System

Two single-stage, double-acting hoist rams, cushioned at both ends of stroke. Electro servo assisted hoist control.

System Pressure 221 bar (3 200 lbf/in²)
Control Valve Pilot Operated, Open Centre
Body Raise Time (loaded) 12 sec
Body Lower Time (power down) 7.5 sec

General Information - Technical Data

Section 000-0000

ELECTRICAL SYSTEM

Type 24 volt, Negative Ground
 Battery Two, 12 Volt, 143 Ah each
 Accessories 24 Volt
 Alternator 70 Amp

BODY

Of all welded construction, fabricated from high hardness (min. 360 BHN) 1 000 MPa (145 000 lbf/in²) yield strength steel. 25° tail chute angle provides good load retention without tailgate.

Plate Thicknesses:

Floor and Tailchute 15 mm (0.59 in)
 Sides 12 mm (0.47 in)
 Front 8 mm (0.31 in)

Volume:

Struck (SAE) 13.0 m³ (17.0 yd³)
 Heaped 2:1 (SAE) 16.0 m³ (21.0 yd³)

SERVICE CAPACITIES

Fuel tank 330 litres (87 US gal)
 Hydraulic System
 (steering & body) 200 litres (52.8 US gal)
 Engine Crankcase 40 litres (10.5 US gal)
 Cooling System 59 litres (15.6 US gal)
 Transmission & filters (dry fill) 52 litres (13.8 US gal)
 Transmission & filters (wet fill) 26 litres (6.9 US gal)
 Differentials - Front & Rear (each) 11 litres (2.9 US gal)
 Differential - Centre 14 litres (3.7 US gal)
 Planetaries (each) 3.5 litres (0.9 US gal)
 Service Brakes 3 litres (0.79 US gal)
 Air Conditioning Compressor 0.125 litres (0.033 US gal)

TYPICAL NOISE LEVELS

Operator Ear (ISO 6394) 79 dbA

*Exterior Sound Rating (SAE J88 JUN 86) TBA dbA

*- The above result is for the mode giving the highest exterior sound level when measured and operated as per the prescribed procedures of the standard. Results shown are for the vehicle in base configuration.

Note: Noise Level Exposure to the operator and bystander personnel may be higher depending upon proximity to buildings, rock piles, machinery, etc.. The actual job site Noise Level Exposure must be measured and applicable regulations complied with in respect to Employee Hearing Protection.

Vehicle Weights		
Standard Vehicle	kg	lb
Net Distribution		
Front Axle	10 585	23 335
Centre Axle	5 000	11 025
Rear Axle	4 970	10 955
Vehicle, Net	20 555	45 315
Payload	27 000	59 525
Gross Distribution		
Front Axle	14 450	31 860
Bogie Axle, leading	16 545	36 470
Bogie Axle, rear	16 560	36 510
Vehicle, Gross	47 555	104 840
Bare Chassis	16 025	35 330
Body	4 000	8 820
Body Hoists (Pair)	530	1 170

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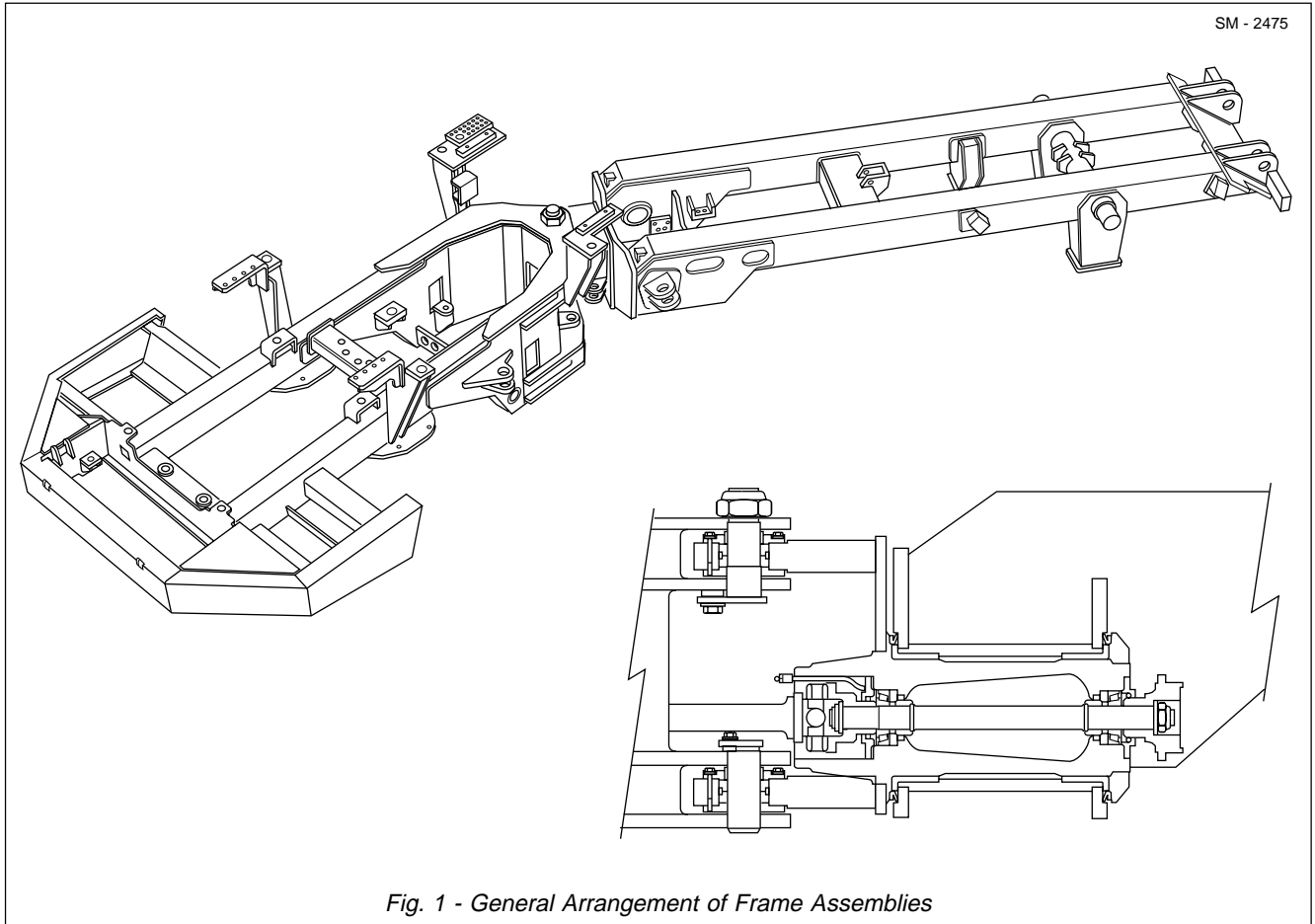


Fig. 1 - General Arrangement of Frame Assemblies

DESCRIPTION

The chassis consists of two separate frame assemblies which provide the articulation of the unit. The front and rear frames are constructed of all welded high-grade steel fabrications with rectangular box section beams forming main, side and cross members. The frames are coupled to provide 45° articulation to each side as well as oscillation.

The front frame is fabricated to form a rigid structure which carries the cab, power train and suspension system.

The rear frame is fabricated to form a rigid structure which carries the body, body hydraulics, suspension and rear drive axles.

Oscillation between the front and rear frames is provided by a large diameter cylindrical coupling carried on nylon bushes located in the rear frame. Longitudinal shocks are absorbed by the thrust faces of the nylon bushes. A large thrust nut, which is threaded to the end of the coupling and locked to the

frame, secures the coupling in position. Wear on the thrust faces of the bushes is compensated by tightening this thrust nut.

INSPECTION AND MAINTENANCE

Inspection

Inspect the frames and attached parts at intervals not exceeding 250 hours for cracked or broken welds and bending of the frame. Any defects found should be repaired before they progress into major failures.

Straightening

Hydraulic straightening or aligning equipment should be used to straighten bent or twisted frames whenever possible. However, if heat must be applied, never heat the metal beyond a dull, cherry red colour, as too much heat will weaken the metal. When it is necessary to heat the metal, apply heat uniformly over the area to be straightened and protect the heated surface from sudden cooling. Frame parts that cannot be straightened should be renewed.

Chassis - Frames

Section 100-0010

Welding

Electric arc welding is recommended for all welded frame repairs. Since the nature and extent of damage to the frame cannot be predetermined, no definite repair procedure can be established. As a general rule however, if parts are twisted, bent or pulled apart or a frame is bent or out of alignment, no welding should be done until the parts are straightened or realigned.

Successfully welded repairs will depend to a great extent upon the use of the proper equipment, materials and the ability of the welder. The Service Department can be consulted regarding the feasibility of, welding repairs.



WARNING

Welding and flame cutting cadmium plated metals produce odourless fumes which are toxic. Recommended industrial hygiene practice for protection of the welding operator from the cadmium fumes and metallic oxides requires enclosure ventilation specifically designed for the welding process. A respiratory protective device such as the M.S.A. 'Gasfoe' respirator with G.M.A. cartridge will provide protection against cadmium, fumes and metallic oxides. The 'Gasfoe' respirator has been approved by the U.S. Bureau of Mines: Approval number 23B-10, and is designed to protect against gases, vapours, and/or metal fumes.

Note: Disconnect the battery and alternator cables before performing any welding on the frames. Failure to do so may seriously damage the machines electrical equipment. Always fasten the welding machines ground cable to the piece/frame being welded if possible.

Note: The current from the welding rod always follows the path of least resistance. If, for example, the ground

clamp is attached to the rear frame when welding is performed on the front frame, the current must pass a frame connection to return to the welding machine. Since the pivot coupling offers the least resistance but not a sound electrical connection, small electric arcs may be set up across the moving parts which may cause welding blotches on their wearing surfaces and increase the wear rate of these components.

Reinforcement

Frame reinforcement can be made with channel or angle or flat structural stock. Whenever possible, the reinforcement should extend well beyond the bent, broken or cracked area. The reinforcement stock thickness should not exceed that of the frame stock and the material should be of the same tensile strength.

Painting

A check of the condition of the paint should be made approximately twice a year and chassis repainted if necessary.



WARNING

Welding, burning, heating or dressing surfaces previously painted using polyurethane paint produces fumes which are toxic. Surfaces must be prepared using paint stripper prior to area being reworked. Recommended Industrial Hygiene and Safety Rules should be followed for protection of the welding operator from the fumes.

To keep rust and corrosion to a minimum, periodic painting of abrasions and other exposed metal areas on the frames is highly recommended.

If painting of a frame is required, thoroughly clean the areas to be painted. Apply a primer coat of red oxide and then a finish coat of polyurethane enamel.

* * * *

CHASSIS - Articulation and Oscillation Pivot

Section 100-0020

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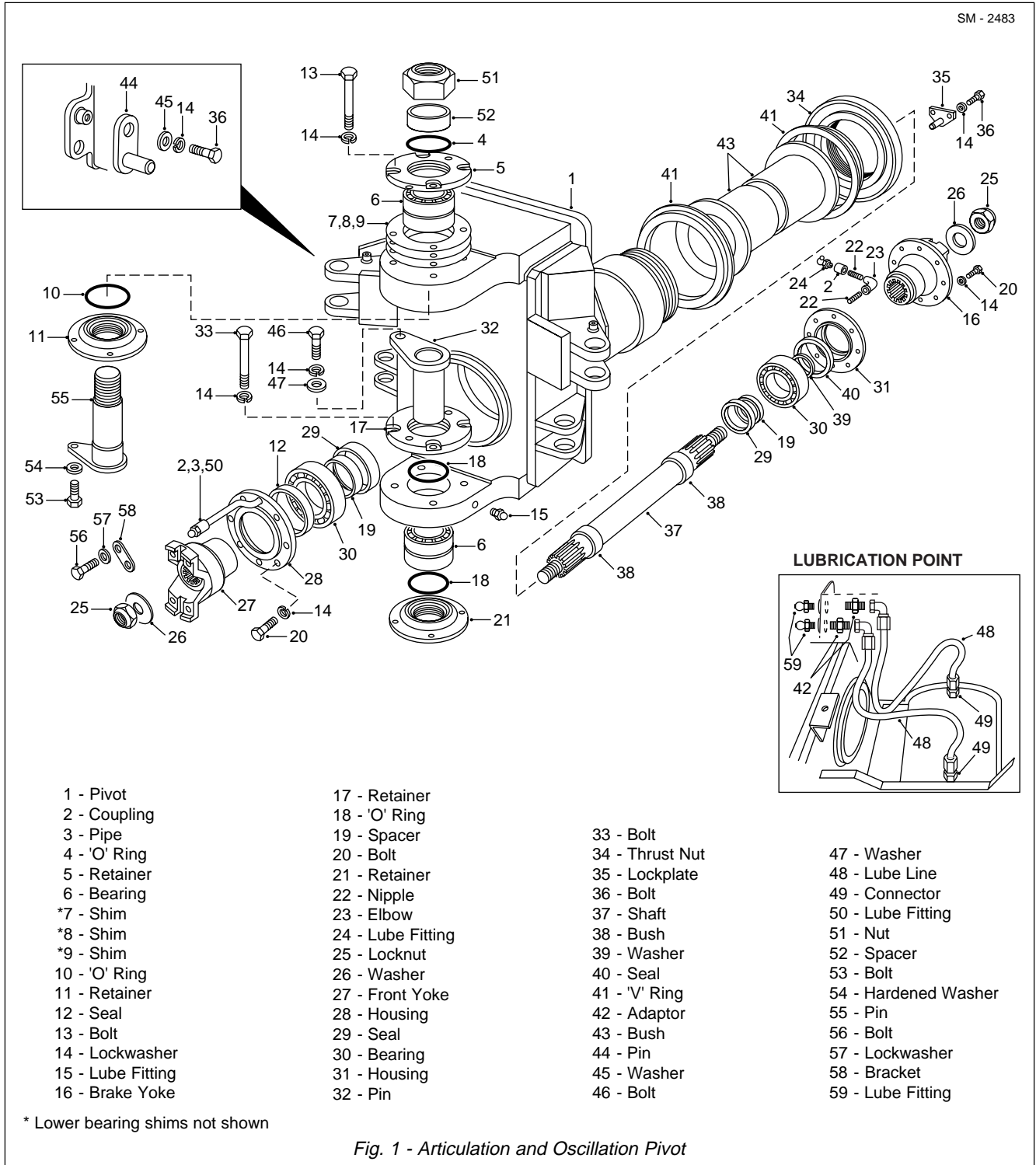


Fig. 1 - Articulation and Oscillation Pivot

DESCRIPTION AND OPERATION

The articulation and oscillation pivot allows the front and rear frames to rotate horizontally (articulation) and tilt laterally (oscillation) with respect to each other. It is also the main load bearing coupling between the two frames. The pivot assembly houses the driveshaft connecting the drive between the front and rear frames.

Articulation bearings, oscillation bushes, pivot driveshaft bearings and associated parts can be removed, inspected and replaced or renewed by following the procedures outlined in this section.

Chassis - Articulation and Oscillation Pivot

Section 100-0020

PIVOT DRIVESHAFT BEARINGS

Removal

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: It is not necessary to separate the frames in order to remove the pivot driveshaft assembly.



WARNING
To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.

1. Position the vehicle in a level work area, apply the parking brake and switch off the engine.

2. Block all road wheels and place the battery master switch in the 'Off' position.

3. Open drain cocks on air tanks to drain air pressure from the tanks. Close air tank drain cocks when air has exhausted from the air tanks.

Note: Take extra care when handling drivelines as any deformity on a rotating mass creates vibration and excessive wear during any operation.

4. Match mark yokes and mating surfaces of transmission - pivot driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

Note: Take care to avoid damaging pipe (3) when performing Step 5.

5. Remove locknut (25) and washers (26) from front

yoke (27). Remove yoke (27) from shaft (37).

6. Remove bolts (1, Fig. 3), lockwashers (2, Fig. 3), nuts (3, Fig. 3) and protective guard (4, Fig. 3), if fitted, from beneath rear of pivot housing.



WARNING
Tensioned spring on adjuster.

7. Slacken adjuster (14, Fig. 3) until brake pads (13, Fig. 3) are sufficiently clear of parking brake disc (5, Fig. 3) to permit removal of calliper (7, Fig. 3).

8. Note positions of front and rear wedge plates (8 & 9, Fig. 3) to aid in 'Installation'. Remove bolts (6, Fig. 3), washers (11, Fig. 3), nuts (12, Fig. 3), front and rear wedge plates (8 & 9, Fig. 3) and left hand torque plate (10, Fig. 3).

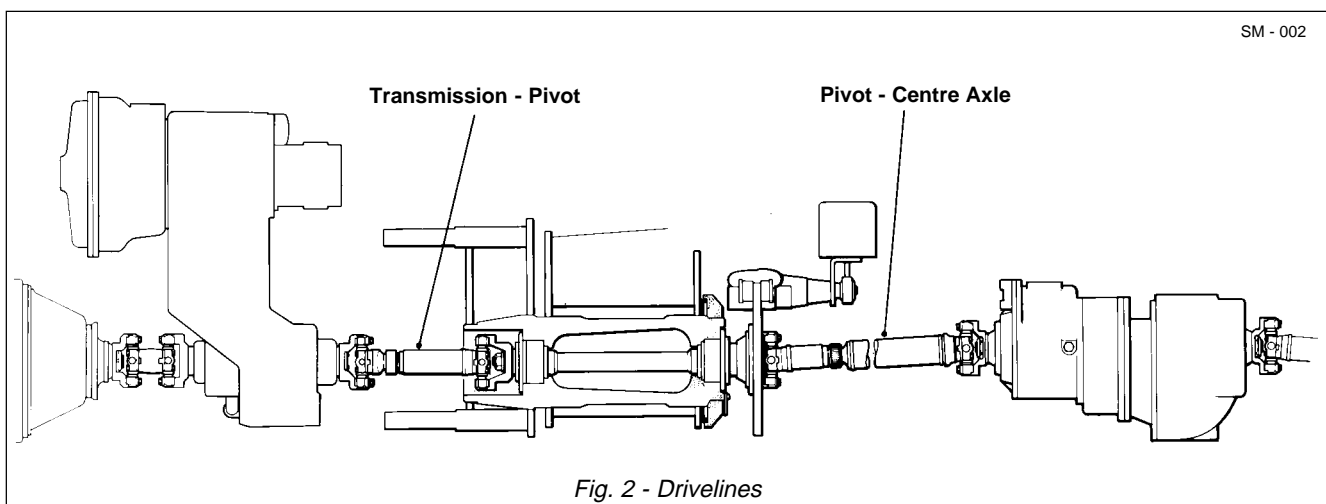
9. Move and secure calliper (7, Fig. 3) clear of parking brake disc (5, Fig. 3).

Note: Take extra care when handling drivelines since any deformity on a rotating mass creates vibration and excessive wear during any operation.

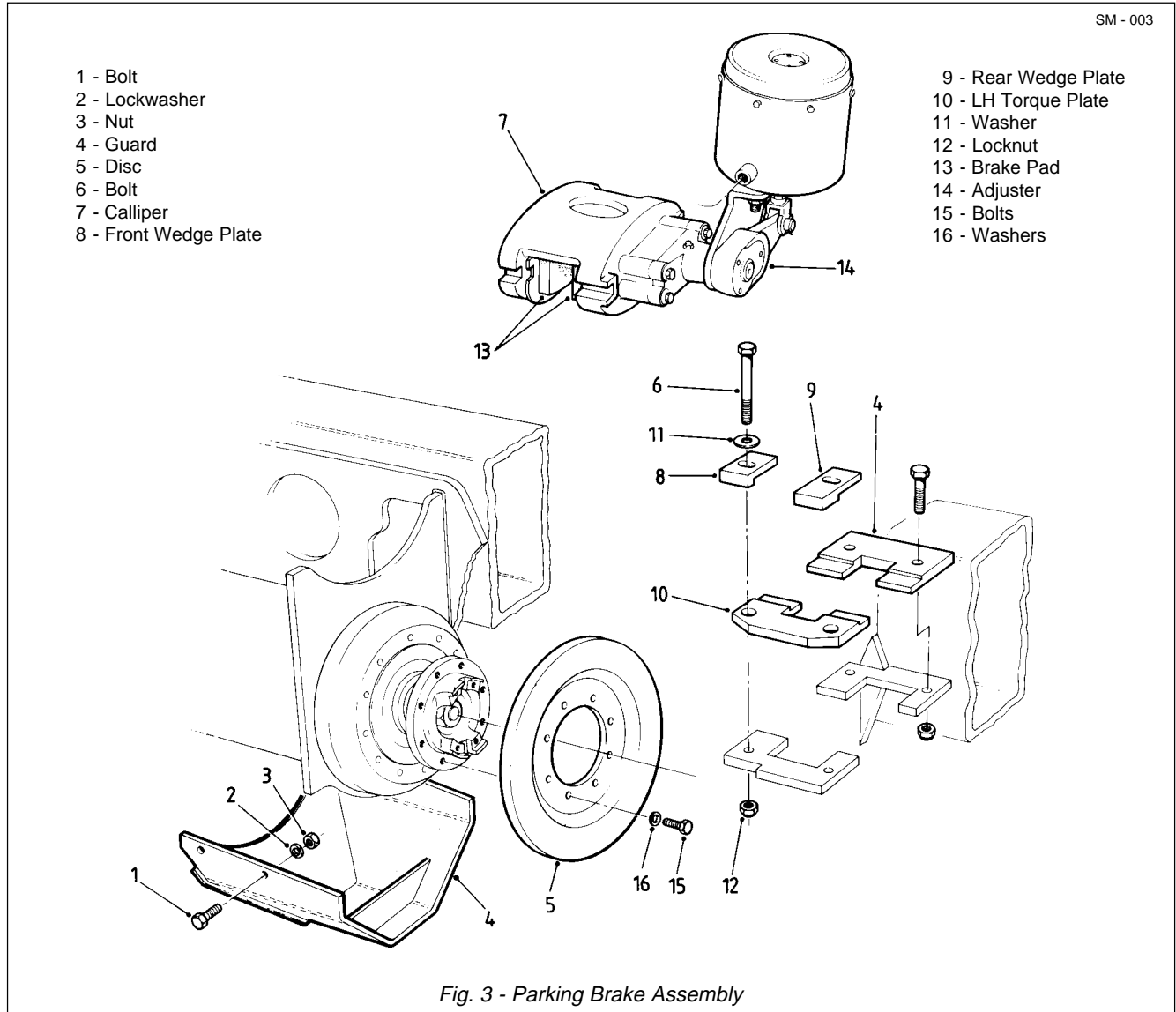
10. Match mark brake yoke (16) and mating surface of pivot - centre axle driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

11. Remove bolts (57) and lockwashers (14) from rear housing (31).

Note: Take extra care when handling driveshafts as any deformity on a rotating mass creates vibration and excessive wear during any operation.



SM - 003



12. Withdraw pivot driveshaft assembly from pivot by pulling rearwards on brake yoke/disc assembly and place in suitable location for further work.

13. Remove front locknut (25) then position front yoke (27) fully on to front of shaft (37) and suitably restrain to resist rotation. Remove rear locknut (25), washers (26) and rear yoke brake/disc assembly (16). Tag front and rear ends of shaft (37) and install locknuts (25) on the shaft to protect the threads.

14. Tag and remove housing (31). Note position of seal (40) to aid in 'Installation'. Remove and discard seal (40).

15. Remove washer (39), rear bearing (30) and spacer (19) from rear of shaft (37).

16. Remove bolt (56), lockwasher (57) and bracket

(58) securing pipe (3) to pivot (1) assembly.

Note: Take care to avoid damaging pipe (3) when performing Steps 17 through 18.

17. Remove bolts (20) and lockwashers (14) from front housing (28).

18. Tag and remove front housing (28). Note position of seal (12) in front housing (28) to aid in 'Installation'. Remove and discard seal (12).

⚠ WARNING
When necessary to drive out components, use a soft drift to avoid injury and damage from flying chips.

19. Using a suitable puller/drift, remove bearing (30).

Chassis - Articulation and Oscillation Pivot

Section 100-0020

20. Remove spacer (19). Note position of seals (29) in pivot (1) housing to aid in 'Installation'. Remove and discard seals (29).

Inspection

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

1. Clean parts with a suitable solvent and let dry. DO NOT spin bearings with compressed air. Place bearings on clean surface, cover with lint free cloth and allow to dry.

2. Check pivot driveshaft bearings (30) for wear or damage, replace if required.

3. Inspect bushes (38) for wear. Replace if badly scored.

Installation

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: Tighten all fasteners without special torques specified, to standard torques listed in Section 300-0080, STANDARD BOLT AND NUT TORQUE SPECIFICATIONS.

Note: If bushes (38) are to be renewed, then proceed with Steps 1 thru 5, if the bushes (38) are satisfactory, proceed from Step 6.

! WARNINGS

To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.

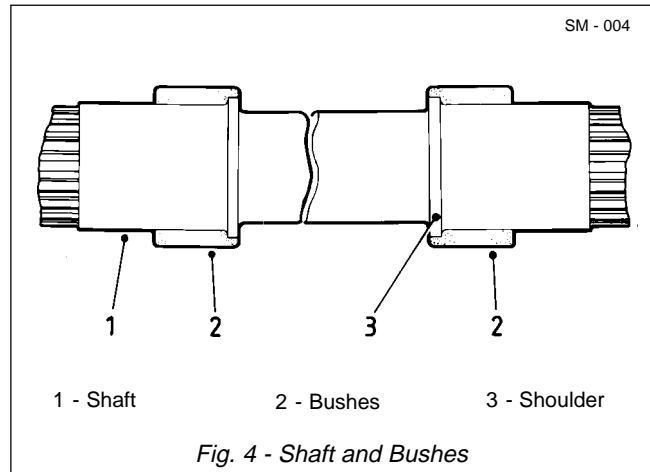
!

When necessary to drive out components, use a soft drift to avoid injury and damage from flying chips.

1. Apply suitable heat to bushes (38) to break bond of retaining compound. Remove locknuts (25) from their protective position on shaft (37), then remove bushes (38) with a suitable drift.

2. Allow shaft (37) to cool. Thoroughly clean shaft (37) and new bushes (38) with a suitable solvent. Wash mating faces of shaft (37) and new bushes (38) with chlorethane and allow to dry.

3. Apply LOCTITE primer to mating faces of shaft (37)



and new bushes (38) and allow to dry. Refer to Fig. 4.

4. Apply LOCTITE Fugeteile 35 to shaft (37) mating faces and install new bushes (38), with the recesses in bushes (38) against shoulder on driveshaft (37). Make sure that bushes (38) are fully home against the shoulders. Refer to Fig. 4.

5. Allow 15 minutes for retaining compound to cure to handling strength.

6. Degrease front bearing (30) housing in pivot (1) with a suitable solvent and allow to dry.

Note: Do not use retaining compound on the housing for the rear pivot shaft bearing.

Note: Front bearing (30) of shaft (37) is secured with retaining compound as well as normal hardware. Cleaning the bearing housing ensures a good bond. THE REAR BEARING IS SECURED BY NORMAL HARDWARE ONLY.

7. Apply coat of grease to new seals (29) and install seals in pivot housing. Make sure seal lips are facing outwards as shown on Fig. 5.

8. Make sure that pivot shaft bearing (30) is pre-packed with grease then position spacer (19), bearing (30) and washer (39) on rear of shaft (37).

9. Apply bead of grease to fill inner rim of new seal (40) and position new seal in rear housing (31). Refer to Fig. 6. Fill lube fitting (24) assembly on rear housing with grease and make sure that nipple (22) does not protrude into grease slot in rear face of housing (31).

Note: Take extra care when handling driveshafts as any deformity on a rotating mass creates vibration and excessive wear during any operation.

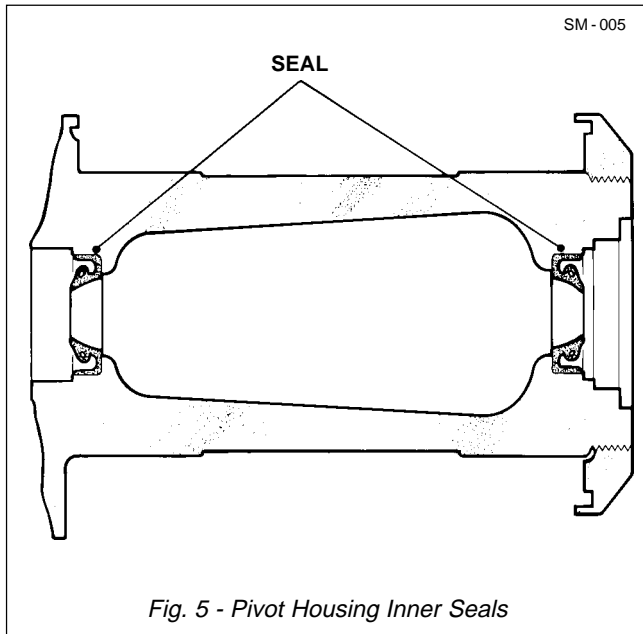


Fig. 5 - Pivot Housing Inner Seals

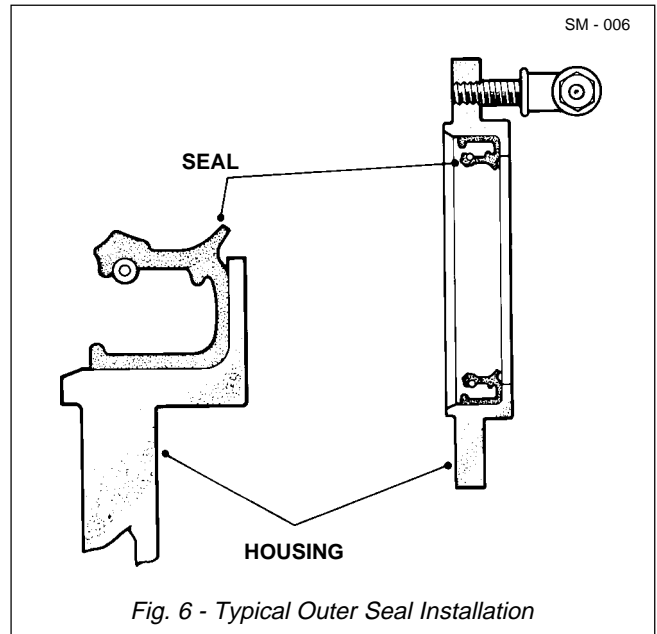


Fig. 6 - Typical Outer Seal Installation

10. Assemble rear housing (31) and brake yoke/disc assembly (16) onto rear of shaft (37). Secure with locknut (25) and both washers (26) but only fingertight at this stage.

11. Insert shaft (37) assembly fully into pivot (1) from the rear. Take care not to dislodge internal seals (29).

12. Partially withdraw shaft (37) assembly to enable housing of rear pivot driveline bearing (30) to be filled with grease from 1/3 to 1/2 of capacity.

13. Reposition shaft (37) assembly fully in pivot (1).

14. Align housing (31) with lube fitting (24) uppermost and secure with lockwashers (14) and bolts (20). Torque tighten bolts (20) to 106 Nm (78 lbf ft).

15. Apply a bead of grease to fill inner rim of new seal (12) and position seal in front housing (28). Refer to Fig. 6. Fill pipe (3), through lube fitting (50), with grease. Make sure that pipe (3) does not protrude into grease slot in rear face of housing (28).

16. Install spacer (19) onto front of shaft (37).

17. Pre-pack bearing (30) with grease taking care not to place any grease on outer curved surface. Clean this surface with a suitable solvent where necessary and allow to dry.

Note: Make sure that Steps 18 through 22 are performed within the hardening time of the retaining compound in use.

18. Make sure mating surfaces of housing (28) are still clean then apply coating of retaining compound to mating surfaces of bearing (30) and housing (28). Install bearing (30) on to front of shaft (37).

19. Pack housing (28) of with grease from 1/3 to 1/2 of capacity.

20. Install front housing (28), front yoke (27), both washers (26) and locknut (25).

Note: Take care to avoid damaging the pipe (3) when performing Steps 21 through 22.

21. Lock brake yoke/disc (16) assembly with a suitable tool and install locknut (25) on front yoke (27). Torque tighten locknut (25) to 678 Nm (500 lbf ft).

22. Lock front yoke (27) and torque tighten locknut (25) on brake yoke assembly to 678 Nm (500 lbf ft).

23. Align front housing (28) with pipe (3) uppermost and secure in place with bolts (20) and lockwashers (14). Torque tighten bolts (20) to 106 Nm (78 lbf ft).

24. Install bracket (58), and secure with lockwasher (57) and bolt (56).

25. Check that no end float exists by pulling and pushing on the brake yoke/disc assembly.

Note: Take extra care when handling drivelines as chips, dents, burrs or deformity on any rotating mass creates vibration and excessive wear during any operation. (Steps 26 & 28).

Chassis - Articulation and Oscillation Pivot

Section 100-0020

26. Connect pivot - centre axle driveline (Fig. 2) to brake yoke/disc assembly as noted on 'Removal'. Install caps and secure with lockwashers and bolts.

27. Position parking brake calliper (7, Fig. 3) in position and install left hand torque plate (10, Fig. 3), front and rear wedge plates (8 & 9, Fig. 3) and secure in place with bolts (6, Fig. 3), washers (11, Fig. 3) and locknuts (12, Fig. 3).

28. Install transmission - pivot driveline (Fig. 2) with caps, lockwashers and bolts as noted on 'Removal'.

29. Position guard (4, Fig. 3), if fitted, and secure to frame using bolts (1, Fig. 3), lockwashers (2, Fig. 3) and nuts (3, Fig. 3).

30. Place the battery master switch in the on position, start the engine and allow air pressure in the tanks to build up to correct operating pressure.

31. Adjust parking brake as shown in Section 170-0010, PARKING BRAKE AND MOUNTING.

32. Remove all blocking from the road wheels.

ARTICULATION BEARINGS

Removal

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: The lengths of the electrical, hydraulic and air connections between the two frames are designed to permit articulation. As a result, the frames can be separated sufficiently to permit removal of the articulation bearings without disconnecting these connections.



WARNING
To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.

1. Position the vehicle in a level work area, apply the parking brake and switch off the engine.

2. Block all road wheels and place the battery master switch in the 'Off' position.

3. Open drain cocks on air tanks to drain air pressure from the tanks. Close air tank drain cocks when air

has exhausted from the air tanks.

4. Position levelling jack under centre front portion of the front frame. Raise jack and block frame to remain level after removal of the articulation pins. Check that front wheels are still effectively blocked.

Note: Make sure that front frame is correctly supported and prevented from tilting on the axle, or damage to coupling etc. could result.

5. Disconnect steering cylinders by removing bolts (36), lockwashers (14), washers (45) and pins (44) from attachment points on pivot (1) housing. Move steering cylinders clear of pivot (1) housing and secure.

Note: Take extra care when handling drivelines as chips, dents, burrs or deformity on any rotating mass creates vibration and excessive wear during any operation.

6. Match mark yokes and mating surfaces of transmission - pivot driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

7. Remove bolt (53) and hardened washer (54) securing pin (55) to pivot (1) housing. Remove nut (51) and withdraw pin (55), tapping pin downwards to ease removal. Take care not to damage the threads on pin (55).

Note: It may be necessary to adjust the frame levelling jack to relieve binding between pin (55) and pin bores during removal.

8. Remove bolt (46), lockwasher (14) and washer (47) securing pin (32) to pivot (1) housing.

9. Remove pin (32), tapping pin upwards to ease removal. Take care not to damage the threads on pin (32).

Note: It may be necessary to adjust the frame levelling jack to relieve binding between pin (32) and pin bores during removal.

10. Attach suitable lifting equipment to the rear frame and take up slack.

Note: Only separate the frames sufficiently to permit removal of the articulation bearings or damage to electrical, hydraulic and air connections could result.

11. Remove blocking from the rear frame and wheels