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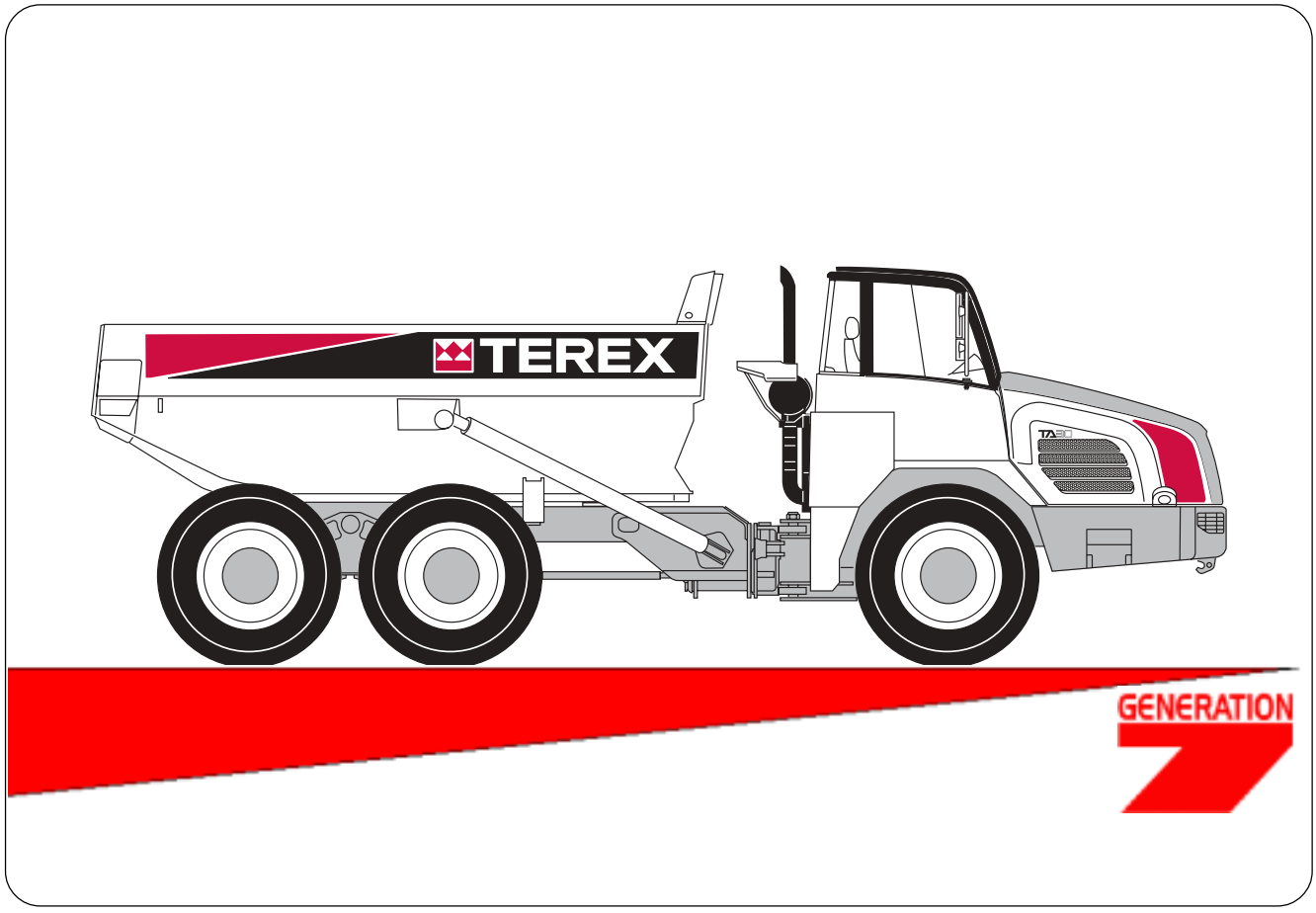
TEREX

# TA30 (Tier 3) Articulated Dumptruck Maintenance Manual

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Part No. 15501359

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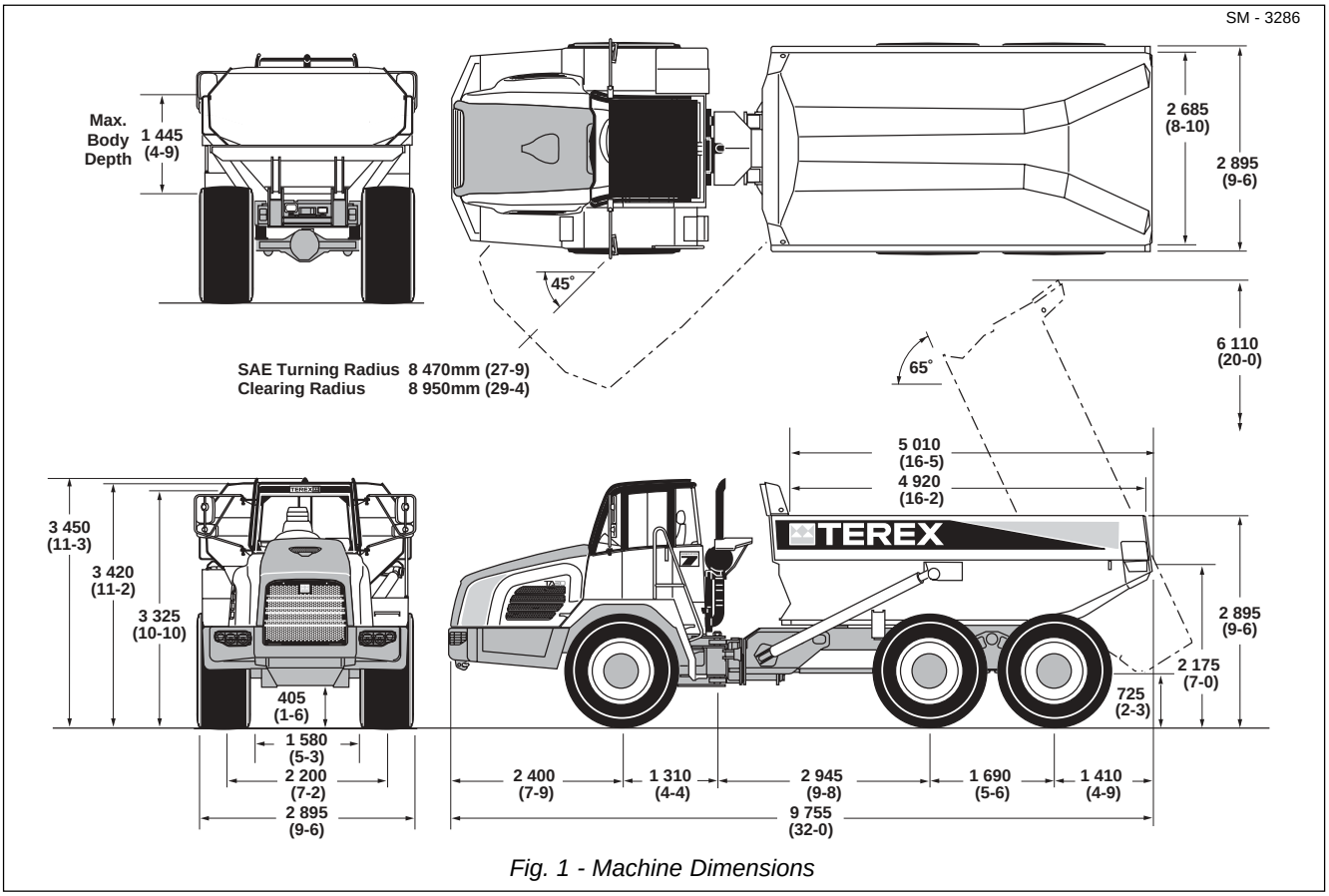


*Fig. 1 - Machine Dimensions*

**ENGINE**

Make/Model ..... Cummins QSM11
Type ..... Four cycle diesel, turbocharged with air-to-air charge cooling, water-cooled. Electronic management.

Gross power at 2 100 rev/min ..... 261 kW (350 hp, 355 PS)
Net power at 2 100 rev/min ..... 248 kW (333 hp, 338 PS)

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

Maximum Torque .... 1 776 Nm (1 310 lbf ft) at 1 400 rev/min
Number of cylinders/configuration ..... 6, in line
Bore x Stroke ..... 125 x 147 mm (4.92 x 5.79 in)
Piston Displacement ..... 10.8 litres (661 in³)
Air cleaner ..... Dry type, double element
Starting ..... Electric
Maximum Speed (No load) ..... 2 350 rev/min
Maximum Speed (Full load) ..... 2 100 rev/min
Idle Speed ..... 750 rev/min
Safe Operating Angle ..... 39°/81% Grade

**TRANSMISSION**

Make/Model ..... ZF 6WG 310 RPC 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 automatically operates 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) ..... 12 ± 2 bar (174 ± 30 lbf/in²)
- Converter 'IN' ..... 10.5 bar (152 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 (Retarder Mode) ..... 145° C (293° F)

Stall Speed ..... 1 805 ± 50 rev/min

Ratios:
- Torque Converter ..... 1.84:1
- Transmission ..... Refer to table below

| Forward | | | | | | |
|---|---|---|---|---|---|---|
| Gear | 1 | 2 | 3 | 4 | 5 | 6 |
| km/h | 5.6 | 8.7 | 13.6 | 21.1 | 31.0 | 51.0 |
| mile/h | 3.5 | 5.4 | 8.5 | 13.1 | 19.3 | 31.7 |
| | | | | | | |
| Reverse | | | | | | |
| Gear | 1 | 2 | 3 | | | |
| km/h | 5.6 | 13.6 | 31.0 | | | |
| mile/h | 3.5 | 8.5 | 19.3 | | | |
| | | | | | | |

# 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 which pivots on the main frame. Suspension is by rubber elements with four heavy duty hydraulic dampers.

**Rear:** Each axle is coupled to the frame by three rubber-bushed links with lateral restraint by a 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. Pivot points on rear suspension linkages are rubber-bushed and maintenance-free.

### 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 750/65 R25** tyres

Tyres:
- Standard ..... 23.5 R25**
- Optional ..... 750/65 R25**

Inflation Pressures (Bridgestone):

| | Front | Rear |
|---|---|---|
| 23.5 R25** ..... | 4.75 bar (69 lbf/in²) | 4.75 bar (69 lbf/in²) |
| 750/65 R25** .. | 3.25 bar (47 lbf/in²) | 3.25 bar (47 lbf/in²) |

Inflation Pressures (Michelin):

| | Front | Rear |
|---|---|---|
| 23.5 R25** ..... | 4.0 bar (58 lbf/in²) | 4.0 bar (58 lbf/in²) |
| 750/65 R25** .... | 3.0 bar (44 lbf/in²) | 3.0 bar (44 lbf/in²) |

Inflation Pressures (Pirelli):

| | Front | Rear |
|---|---|---|
| 23.5 R25** ..... | 4.8 bar (70 lbf/in²) | 4.8 bar (70 lbf/in²) |

Inflation Pressures (Continental):

| | Front | Rear |
|---|---|---|
| 23.5 R25** ..... | 5.0 bar (73 lbf/in²) | 5.0 bar (73 lbf/in²) |

Inflation Pressures (Marangoni):

| | Front | Rear |
|---|---|---|
| 750/65 R25** .... | 3.0 bar (43 lbf/in²) | 3.0 bar (43 lbf/in²) |

**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

Braking, steering and body hoist systems are controlled by a main hydraulic valve mounted on frame. Systems are supplied with oil from a common tank by the main hydraulic pump, driven from power takeoff on transmission. System components are protected by full flow filtration on the return line.

Pump:
- Type ..... Piston
- Capacity at 2 100 rev/min ..... 4.9 litre/s (77.4 US gal/min)

#### Brakes

All hydraulic braking system with dry disc on each wheel with two heavy-duty callipers per disc. Independent circuits for front and rear brake systems. Warning lights and audible alarm indicate low brake system pressure. Brake system conforms to ISO 3450, SAE J1473.

Actuating Pressure ..... 103 bar (1 500 lbf/in²)

Discs:
- Diameter ..... 477 mm (18.8 in)
- Thickness ..... 16 mm (0.63 in)

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

Emergency: Automatic application of driveline brake should pressure fall in main brake hydraulic system. Service brakes may also be applied using the parking-emergency brake control.

Retardation: Hydraulic retarder integral with transmission, or optional engine brake.

#### Steering

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

#### Body Hoist

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

System Pressure ..... 220 bar (3 200 lbf/in²)
Control Valve ..... Pilot Operated, Closed Centre
Body Raise Time (loaded) ..... 12 sec
Body Lower Time (power down) ..... 7.5 sec

### 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 ..... 14 mm (0.55 in)
- Sides ..... 12 mm (0.47 in)
- Front ..... 8 mm (0.31 in)

Volume:
- Struck (SAE) ..... 13.8 m³ (18.0 yd³)
- Heaped 2:1 (SAE) ..... 17.5 m³ (22.9 yd³)

**SERVICE CAPACITIES**

Fuel tank ..... 398 litres (103 US gal)
Hydraulic System ..... 202 litres (53.4 US gal)
Engine Crankcase and filters ..... 34 litres (9.0 US gal)
Cooling System ..... 54 litres (14.3 US gal)
Transmission (including cooler) ..... 63 litres (16.6 US gal)
Differentials - Front & Rear (each) ..... 17 litres (4.5 US gal)
Differential - Centre ..... 18.5 litres (4.9 US gal)
Planetaries (each) ..... 3 litres (0.8 US gal)
Hand Pump Tank ..... 1 litres (0.26 US gal)
Air Conditioning Compressor ..... 0.125 litres (0.033 US gal)

**TYPICAL NOISE LEVELS**

Operator Ear (ISO 6394) ..... 78 dbA

*Exterior Sound Rating (ISO 6395) ..... 110 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

23.5 R25 Tyres

| Standard Vehicle | kg | lb |
|---|---|---|
| **Net Distribution** | | |
| Front Axle | 11 720 | 25 840 |
| Centre Axle | 5 300 | 11 685 |
| Rear Axle | 5 400 | 11 905 |
| **Vehicle, Net** | **22 420** | **49 430** |
| **Payload** | **28 000** | **61 730** |
| **Gross Distribution** | | |
| Front Axle | 16 800 | 37 040 |
| Centre Axle | 16 720 | 36 860 |
| Rear Axle | 16 900 | 37 360 |
| **Vehicle, Gross** | **50 420** | **111 260** |
| Bare Chassis | 17 490 | 38 560 |
| Body | 4 400 | 9 700 |
| Body Hoists (Pair) | 530 | 1 170 |

## Ground Pressures

At 15% sinkage of unloaded radius and specified weights

| 23,5 R25 | Net | Loaded |
|---|---|---|
| Front | 115 kPa (16.7 psi) | 165 kPa (23.9 psi) |
| Rear | 52 kPa (7.5 psi) | 165 kPa (23.9 psi) |
| **750/65 R25** | **Net** | **Loaded** |
| Front | 90 kPa (13.1 psi) | 128 kPa (18.6 psi) |
| Rear | 41 kPa (5.9 psi) | 111 kPa (18.6 psi) |

## Welding

**WARNINGS**
**Before any welding is done on a machine equipped with any electronic systems, disconnect the following (if applicable) in this order: Battery earth cable, battery supply cable, alternator earth cables, alternator supply cables and electrical connections at the engine ECM, transmission ECU, body control lever, hydraulics ECU and cab bulkhead to avoid damage to electrical components. Turn off battery master switch to isolate the batteries before disconnecting any components.**
**After welding connect all of the above in the reverse order.**

**Before any welding is done ensure all paint has been removed from the area to be welded. Failure to do so may result in hazardous fumes being given off from the paint.**

**Note:** Always fasten the welding machines ground cable to the piece/frame being welded if possible.

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 Customer Support 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:** 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.

## General Welding Procedure

The following general procedure should be used for the repair of defects outwith the vicinity of alloy steel castings.

1. Completely ARC-AIR gouge or grind out the crack until sound metal is reached. If ARC-AIR method is employed, pre-heat area to 100° C (212° F), measure 3 - 4" either side of repair prior to gouging. On completion of gouging grind to remove thin carbon layer.

2. Apply dye-penetrant check to ensure crack has been completely removed.

3. Pre-heat area to 100° C (212° F), measured 3 - 4" either side of repair. Avoid local overheating.

4. Weld completely using E-7016 electrodes. Care must be taken to ensure electrodes are protected from moisture pick-ups at all times.

5. Allow repair weld to cool slowly.

6. Grind and blend repair to original contour. Paint heat damaged areas.

The following general procedure should be used for the repair of defects in alloy steel castings and in the welds joining steel castings.

1. Completely ARC-AIR gouge or grind out the crack until sound metal is reached. If ARC-AIR method is employed, pre-heat area to 200° C (392° F), measure 3 - 4" either side of repair prior to gouging. On completion of gouging grind to remove thin carbon layer.

2. Apply dye-penetrant check to ensure crack has been completely removed.

3. Pre-heat area to 200° C (392° F), measured 3 - 4" either side of repair. Avoid local overheating.

4. Weld completely using E-7016 electrodes. Care must be taken to ensure electrodes are protected from moisture pick-ups at all times.

5. On completion of welding, post-heat repair area to 400° C (752° F), measure 3 - 4" either side of repair.

6. If welding has to be interrupted for any reason, e.g. overnight, post-heat immediately as in Step 5.

* * * *

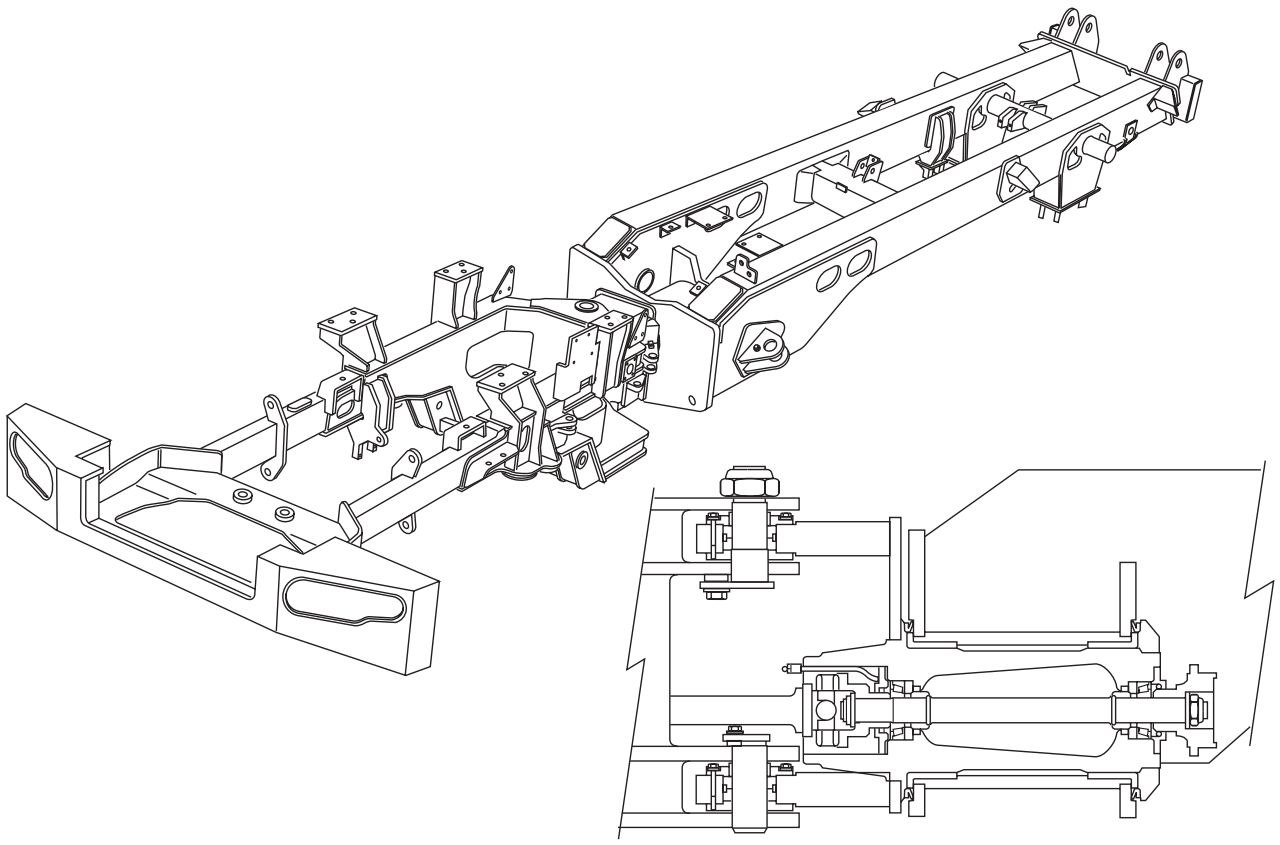


*Fig. 1 - General Arrangement of Frame Assemblies*

## 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 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.

Steering is by frame articulation to 45° either side by two widely spaced vertical pivot pins in taper roller bearings. 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.

## Welding

**⚠ WARNINGS**

**Before any welding is done on a machine equipped with the Quantum Electronic Fuel System, disconnect the following in this order: Battery earth cable, battery supply cable, alternator earth cables, alternator supply cables, body hydraulics joystick and electrical connections at the engine ECM, transmission ECU and hydraulics ECU to avoid damage to electrical components. Turn off battery master switch to isolate the batteries before disconnecting any components.**
**After welding connect all of the above in the reverse order.**

⚠

**Before any welding is done ensure all paint has been removed from the area to be welded. Failure to do so may result in hazardous fumes being given off from the paint.**

**Note:** Always fasten the welding machines ground cable to the piece/frame being welded if possible.

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 Customer Support 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:** 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 polyurethane red oxide and then a finish coat of polyurethane enamel.

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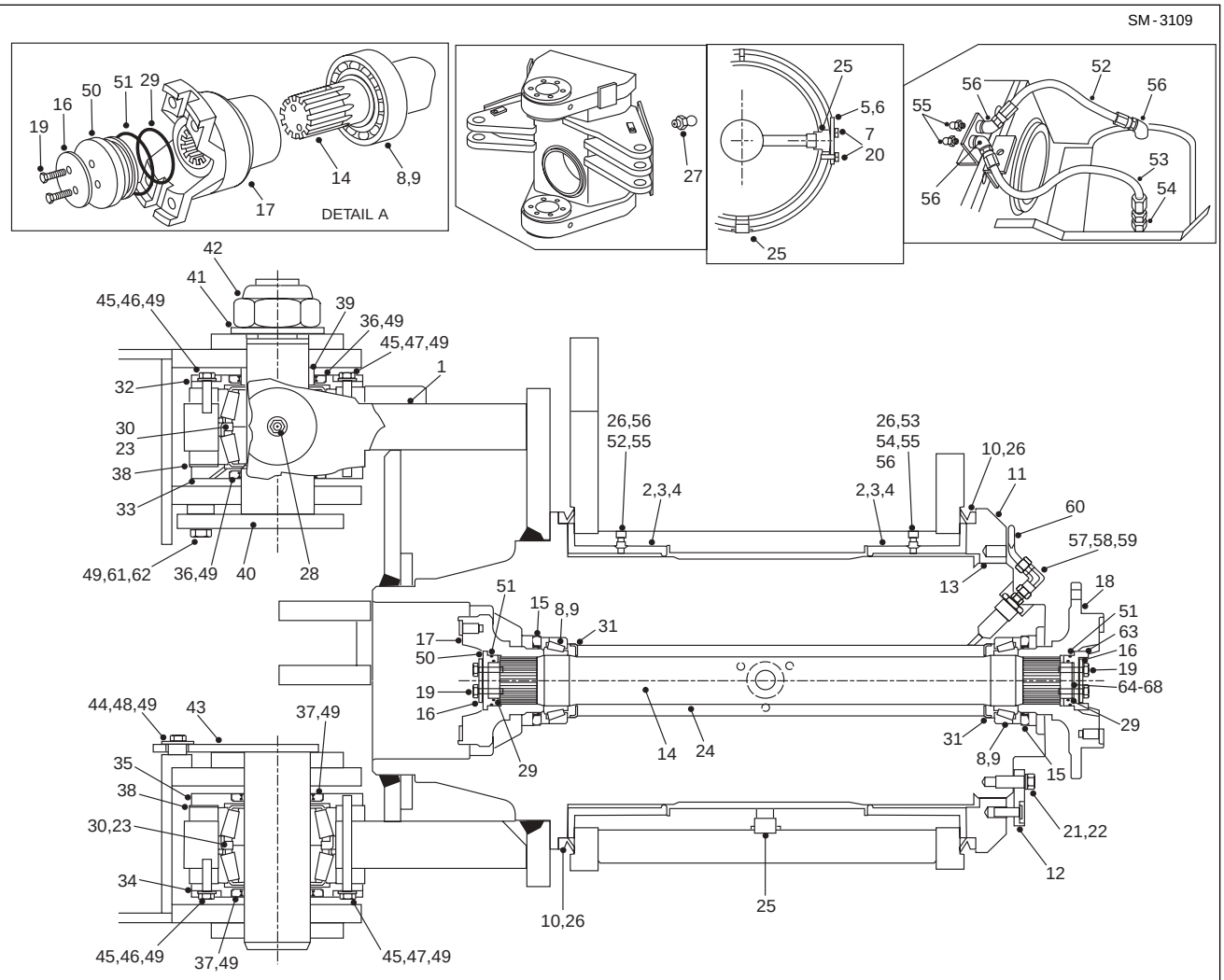


1 - Pivot Assembly
2 - Nylon Bush
3 - Loctite 648
4 - Loc Quick Primer
5 - Gasket
6 - Cover Plate
7 - Bolt
8 - Bearing Assy - Cup
9 - Bearing Assy - Cone
10 - 'V' Ring Seal
11 - Thrust Nut
12 - Locking Plate
13 - Antiseize Comp
14 - Driveshaft
15 - Seal
16 - Lockplate
17 - Front Yoke
18 - Brake Yoke
19 - Bolt
20 - Washer
21 - Lockwasher
22 - Bolt
23 - Extreme Pressure Lithium No.2 Grease
24 - SAE 80W-90 EP Gear Oil
25 - Plug
26 - Extreme Pressure Multipurpose Grease
27 - Lube Fitting
28 - Plug
29 - 'O' Ring
30 - Bearing Assembly
31 - Retaining Ring
32 - Seal Housing
33 - Seal Housing
34 - Seal Housing
35 - Seal Housing
36 - Seal
37 - Seal
38 - Shim
39 - Spacer
40 - Upper Pin
41 - Washer
42 - Nut
43 - Lower Pin
44 - Hardened Washer
45 - Washer
46 - Bolt
47 - Bolt
48 - Bolt
49 - Loctite 243
50 - Thrustcollar-Front
51 - 'O' Ring
52 - Hose Assembly
53 - Hose Assembly
54 - Connector
55 - Lube Fitting
56 - Elbow
57 - Adaptor
58 - Connector
59 - Elbow
60 - Pipe Assembly
61 - Washer
62 - Bolt
63 - Thrust collar-Rear
64 - Shim
65 - Shim
66 - Shim
67 - Shim
68 - Shim

*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 bearing and associated parts can be removed, inspected and replaced or renewed by following the procedures outlined in this section.

## THRU-DRIVE DRIVESHAFT

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

**Note:** The following procedures assume that only thru-drive components require repair.

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

**⚠ WARNINGS**

**To prevent personal injury and property damage, be sure wheel blocks are properly secured and of adequate capacity to do the job safely.**

**⚠ When necessary to drive out or drive on components during disassembly/assembly, be sure to use a soft drift to prevent property damage and personal injury.**

### Removal and Disassembly

1. Position the vehicle on a level work area and apply parking brake.

2. Raise body and install body safety prop to secure body in partially raised position.

3. Shut down engine and block all wheels securely.

4. Identify the relationship of the driveline caps to the transmission yoke and front yoke (17). Remove capscrews and remove driveline from vehicle.

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

5. Remove wheel blocks, start engine and steer vehicle into a full left-hand lock. Shut down engine and block all wheels securely.

6. Remove Lockplate (16) , 2 0ff Front bolts (19) & Front thrust collar (50).

7. Remove and discard 'O' rings (29 & 51) from Thrust collar (50).

8. Place a suitable container under the front of the pivot and pull front yoke (17) from driveshaft (14).

9. Disconnect mounting hardware securing protective guard (if fitted), from beneath the parking brake disc, to the rear frame.

10. Release the parking brake by turning the hex-head on the parking brake actuator fully anticlockwise.

**⚠ WARNING**

**Tensioned spring on adjuster.**

11. Remove mounting hardware securing parking brake assembly to mounting bracket on frame, then secure parking brake assembly clear of brake disc.

12. Identify the relationship of the driveline caps to brake yoke (18). Remove capscrews, disconnect driveline and secure clear of brake yoke.

13. Withdraw driveshaft assembly (14) from housing by pulling rearwards on parking brake disc/brake yoke assembly (18). If necessary, tap front end of driveshaft (14) to ease removal, take care to avoid damaging threads. Place driveshaft (14) assembly on work bench for further disassembly.

14. Prise out and discard seal (15) from front of the housing.

15. Lift out front bearing assembly cup (8) from front of the housing.

16. If bearing replacement is required, use a suitable puller to remove front and rear bearing assembly cups (8) from the housing.

**Note:** If either bearing assembly cup or cone (8 or 9) need replacing, they must be replaced as a set.

17. If retaining rings (31) need replacing, use a suitable drift or puller to remove them from the housing.

18.Temporarily install front yoke (17) fully onto front of driveshaft (14) and suitably restrain to resist rotation.

19. Remove mounting hardware securing parking brake disc to brake yoke (18) and remove brake disc.

20. Remove Lockplate (16) , 2 off Rear bolts (19) , Rear Thrust collar (63) & Brake yoke (18) from driveshaft (14). Identify front and rear ends of driveshaft (14).

21. Remove and discard 'O' rings (29 & 51) from Rear Thrust collar (63).

22. Remove and discard seal (15) from driveshaft (14).

23. If bearing replacement is required, use a suitable puller or drift to remove rear bearing assembly cone (9) from driveshaft (14).

**Inspection**

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

2. Check bearing assemblies cups and cones (8 & 9) for wear or damage. Renew as necessary.

**Note:** If either bearing assembly cup or cone (8 or 9) need replacing, they must be replaced as a set.

3. Inspect splines of driveshaft (14) and yokes (17 & 18) for nicks, burrs or excessive wear. Replace if wear is excessive or splines are nicked. Burrs may be removed with a fine file or medium India stone.

4. Check yokes (17 & 18) for damage in region polished by oil seal lip; even slight damage in this area can cause leakage. Very slight marks may be polished out with fine emery cloth but it is essential that polishing marks are parallel to the seal lip.

5. Replace all seals and 'O' rings with new parts.

## Assembly and Installation

1. If removed, use a suitable driver and install retaining rings (31) into housing, ensuring that they butt hard against abutment shoulders.

2. Using a suitable driver, install front bearing cup (8) into tractor end of pivot casing. Ensure it is firmly seated & that a 0.05mm (0.002") feeler gauge **cannot** be inserted between cup and mating face.

3. Check rear bearing cup (8) is firmly seated in the body end of the pivot casing, again ensuring 0.05mm (0.002") feeler gauge **cannot** be inserted between cup and mating face.

4. Lightly oil both bearing assembly cones (9) with SAE 80W - 90 E. P. gear oil (24).

5. Support driveshaft (14) in a suitable fixture & tap one Bearing assembly cone (9) onto driveshaft (14) using a tubular mandrel.

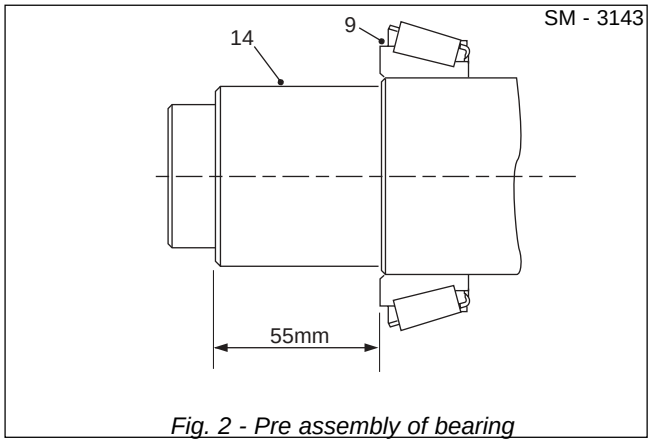

*Fig. 2 - Pre assembly of bearing*

6. Refer to Fig. 2, Maintain end face of cone approximately 55mm from end of spline face.

7. Insert driveshaft (14) into truck end of pivot casing until bearing assembly cone (9) seats firmly in the bearing asembly cup (8).

8. Apply loctite (3) to new seal (15) and fit over the driveshaft (14) with seal 'Lip' to bearing side.Press seal home using a mandrel.

9. Apply grease to splines of Front yoke (17) and slide onto the drive shaft (14).

10. Fit new 'O'-rings ( 29 & 51) to Front thrust collar (50) and fit collar over stub end of driveshaft (14) (align mating holes). Fit 2 off front bolts (19).

11. Tighten Front bolts (19) ; alternately 1/4 - 1/2 turns, drawing driveshaft (14) hard against the inner face of Front thrust collar (50). Shaft will be visible through inspection hole on the collar.

12. Lock Front yoke (17) from rotation by a suitable method / bar acting on the ground. Torque front bolts (19) to 54Nm/39 Ibf ft.

13. Using special mandrel (15270104) home locking plate (16) onto Bolts (19). Remove the clamping bar.

14. Slide Rear bearing asembly cone (9) onto rear end of drive shaft (14) until it seats in bearing assembly cup (8).

15. Position clamping bar assembly and screw central bolt hard against bolts (19) of front thrust collar (50), enabling body end bearing to be fully seated home.

16. Using mandrel and heavy hammer, drive Rear bearing assembly cone, fully into cup. Now remove clamp bar assembly from front end.

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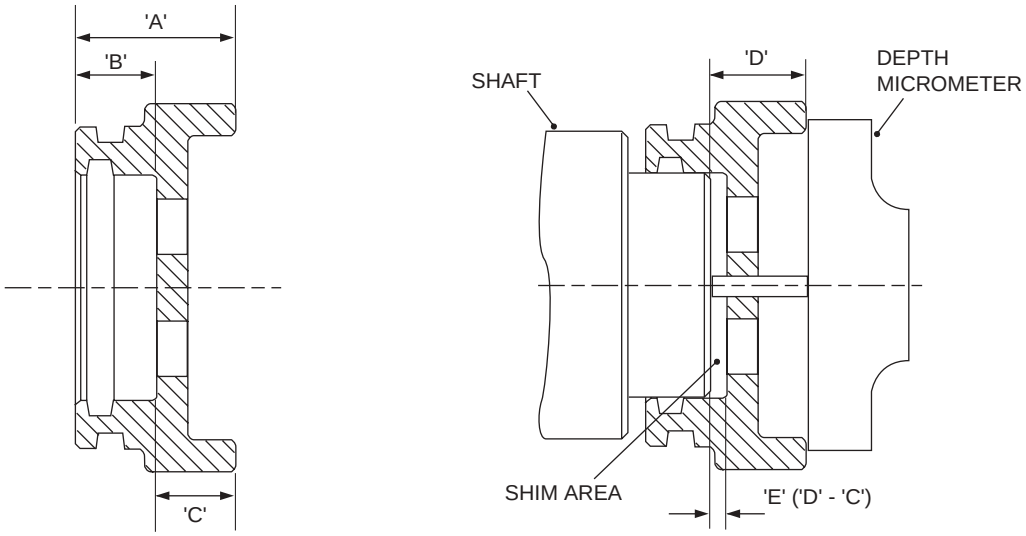


*Fig. 3 - Measurements / various*

17. Take remaining seal (15), apply loctite (3) and fit over drive shaft with seal 'Lip' to bearing side. Press seal home using a mandrel.

18. Apply grease to splines of brake yoke (18) and slide onto drive shaft (14). Ensure milled slots of driving flanges are aligned with those of brake yoke.

**Note :** For Measurment letters- refer to fig. 3, unless otherwise stated.

19. Before fitting of Rear Thrust collar (63) record Measurements as stated:

i) Measure total width 'A' of Rear thrust collar (63)

ii) Using Depth micrometer, measure inner bore depth 'B' of collar (63) and record value.

iii) Subtract 'B' from 'A' to determine recess dimension 'C'.

20. Fit Rear thrust collar (63) without 'O'-rings onto Drive shaft (14) and tighten Rear bolts (19) to a nominal torque of 15Nm/11Ibf ft.

**Note :** a gap should be visible between end of shaft and inner face of collar.

21. Using a Depth micrometer, measure distance 'D' from collar (63) outer face to end face of drive shaft (14) via the hole in the collar and record the value.

22. The actual free air space 'E' to be shimmed between end of drive shaft (14) and compression face of Thrust collar (63) equals:

E='D' - 'C'.

23. Now add 0.6mm (0.024") to dimension 'E' to allow for oversize shims. This value is dimension 'F' (End float will be determined by subtraction).

24. Remove Rear bolts (19) and Rear thrust collar (63) from pivot body end and chap drive shaft (14) to free bearing.

25. Calculate the nominal combination of minimum number if shims (64) to achieve the size nearest to dimension 'F'. Record the appropriate part numbers and total nominal thickness value.

26. Select the shims (64) and measure the total actual thickness of the combination. Record this value.

27. Place the shim pack (64) in the rear thrust collar (63) , lock off the Brake yoke (18) from rotation by suitable method / bar on ground. Torque bolts (19) to full torque.

28. Remove the clamp and spin the yoke (18) to ensure driveshaft (14) free rotation.

29. Take a magnetic clock gauge located on the flange of pivot casing, needle acting on rear thrust collar (63)

end face. Check Brake yoke (18) float movement.

30. Take reading obtained and subtract a figure sufficient to give an end float in the range 0.05mm - 0.15mm (0.002" - 0.006"), reduce shim pack (64) accordingly.

31. Remove Rear thrust collar (63) and shims (64) and re-assemble with the apporpriate shims. Ensure 'O'-rings (29 & 51) are now fitted.

32. Lock Brake yoke (18) flange as before ,applying alternate 1/4 -1/2 turns on bolts (19). Torque to 54 Nm (39 lbf ft).

33. Remove the locking bar and confirm that the driveshaft (14) end float is in the range 0.05mm - 0.15mm (0.002" - 0.006") by moving the brake yoke (18) for and aft against the clock gauge.

34. Adjust and refit the shim pack (63) as necessary.

35. Float set correctly; Drive home locking plate (16) using a mandrel (15270104) . Re-check the end float.

36. Install parking brake disc on brake yoke (18) and secure with bolts and washers. Tighten bolts to a torque of 73 Nm (54 lbf ft).

37. Install parking brake assembly to mounting brackets and secure with bolts, washers and nuts. Refer to Section 170-0010, PARKING BRAKE AND MOUNTING.

38. Apply parking brake by turning the hex-head on the parking brake actuator fully clockwise.

39. Apply Loctite 638 to the threads of capscrews used to mount driveline to brake yoke (18). Align match marks and install driveline. Tighten capscrews to a torque of 153 Nm (113 lbf ft).

40. Apply Loctite 638 to the threads of capscrews used to mount driveline between transmission yoke and front yoke (17). Align match marks and install driveline. Tighten capscrews to a torque of 153 Nm (113 lbf ft).

41. Remove bolts (7), washers (20), gasket (5) and cover plate (6) from side of oscillation hub to gain access to filler/level hole plug (25) on pivot assembly (1). Remove filler/level plug (25).

42. Add SAE 80W - 90 E. P. gear oil (24) through filler/level hole in pivot assembly (1) until the oil is level with the bottom of filler/level hole.

43. Remove plug (25) from underside of oscillation hub to drain the cavity between the oscillation hub and pivot assembly (1) of any oil that entered while filling the driveshaft bearing housing.

44. Install plug (25) into filler/level hole on pivot assembly (1). Install gasket (5) and cover plate (6) on side of oscillation hub, secure with bolts (7) and washers (20).

45. Install plug (25) into cavity drain port on underside of oscillation hub.

46. Install parking brake disc protective guard (if fitted) and secure with bolts, washers and nuts. Tighten nuts to a torque of 73 Nm (54 lbf ft).

47. Start engine, raise body, lower body safety prop and lower body.

48. Remove wheel blocks.

## ARTICULATION COMPONENTS

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

**Note:** The following procedures assume that only components associated with articulation require repair.

**Note:** It is essential that the grease used for articulation components is Extreme Pressure Lithium Complex No. 2 (23), as specified in Section 300-0020, LUBRICATION SYSTEM.

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

**⚠ WARNINGS**
**To prevent personal injury and property damage, be sure wheel blocks, blocking materials and lifting equipment are properly secured and of adequate capacity to do the job safely.**

**⚠ When necessary to drive out or drive on components during disassembly/assembly, be sure to use a soft drift to prevent property damage and personal injury.**

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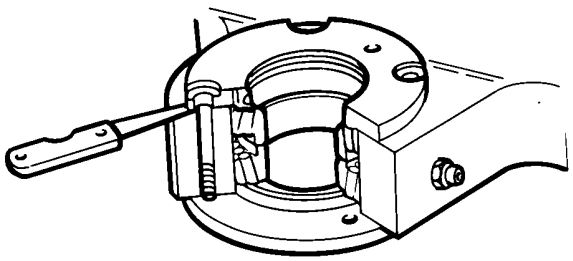


*Fig. 4 - Determining Shim Thickness*

## Disconnecting Front and Rear Frames

**Note:** The front and rear frames can be separated sufficiently to permit disassembly/assembly of the articulation components without disconnecting hydraulic lines or electrical wiring.

1. Position the vehicle on a level work area and apply parking brake.

2. Raise body and install body safety prop to secure body in partially raised position.

3. Shut down engine and block all wheels securely.

4. Identify the relationship of the driveline caps to the transmission yoke and front yoke (17). Remove capscrews and remove driveline from vehicle.

5. Support tractor frame at front and rear with suitably placed stands or timbers so the frame will remain level during and after pin removal.

6. Remove bolts, washers and pins securing steering cylinders to pivot. Secure steering cylinders clear of pivot.

7. Release the parking brake by turning the hex-head on the parking brake actuator fully anticlockwise.

**⚠ WARNING**
**Tensioned spring on adjuster.**

8. Attach suitable lifting equipment to pivot/rear frame assembly. Lifting equipment must prevent pivot from oscillating after separation, and, be capable of pulling pivot/rear frame assembly clear of front frame. Raise lifting equipment to support pivot/rear frame assembly.

9. Remove bolt (62), washer (61), large nut (42) and washer (41) securing upper pin (40).

10. Remove upper pin (40). If necessary tap upper pin (40) to ease removal taking care to avoid damaging the threads.

**Note:** It may be necessary to relieve binding between the pin and pin bores by raising or lowering the pivot/ rear frame assembly.

11. Remove bolt (48) and hardened washer (44) securing lower pin (43).

12. Remove lower pin (43). If necessary tap lower pin (43) to ease removal taking care to avoid damaging the pin.

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

13. Remove blocks from rear wheels and use lifting equipment to pull pivot/rear frame assembly clear of the front frame. After moving, block pivot/rear frame assembly and block the wheels.

14. Remove spacer (39) noting orientation to ensure correct installation.

## Disassembly

1. Identify seal housings (32, 33, 34 & 35) to ensure correct location on assembly/installation.

**Note:** Seal housings (32, 33, 34 & 35) are not interchangeable.

2. Remove bolts (46 & 47), washers (45), seal housings (32, 33, 34 & 35) and upper and lower shims (38).

3. Prise out and discard seals (36 & 37) from the housings.

4. Remove and tag all bearing assemblies (30) with spacers to ensure correct assembly/installation.

**Note:** Bearing assemblies (30) and spacers are a matched set, never interchange cups, cones or spacers between sets.

## Inspection

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

and allow to dry.

2. Check bearing assemblies (30) and spacers, and pins (40 & 43) for wear or damage. Renew as necessary.

**Note:** Bearing assemblies (30) and spacers must be renewed as a matched set.

3. Replace all seals with new parts.

## Assembly

1. Apply Loctite 243 (49) sparingly to bore of seal housings (32, 33, 34 & 35).

2. Using a suitable driver, install seals (36 & 37) into seal housings (32, 33, 34 & 35) ensuring that the metal ring on inside of the seals are not disturbed, and, that they are located towards the inside of seal housing.

3. Apply Loctite 243 (49) to threads of outer seal housing bolts (46).

4. Place outer seal housings (32 & 34) in position ensuring that grease relief hole in seal housings are directly opposite bearing grease port on pivot. Secure with bolts (46) and washers (45). Tighten bolts (46) to a torque of 94 Nm (68 lbf ft).

**Note:** Bearing assemblies (30) and spacers are a matched set, never interchange cups, cones or spacers between sets.

5. Using Extreme Pressure Lithium Complex No. 2 grease (23), pack bearing assemblies (30), including end faces, and install bearings.

6. Place inner seal housings (33 & 35) temporarily in position and secure with bolts (47) and washers (45). Tighten bolts (47) to a torque of 16 Nm (12 lbf ft).

7. Using feeler gauges, as shown in Fig. 4, measure the dimension between the inner pivot faces and seal housings (33 & 35). Measure at 3 positions equally spaced around seal housings and determine average dimension, this is the size of shims (38) required.

8. Remove bolts (47), washers (45) and inner seal housings (33 & 35).

9. Install shims (38) as calculated at Step 7, reinstall inner seal housings (33 & 35) and secure with bolts (47) and washers (45). Tighten bolts (47) to a torque of 94 Nm (68 lbf ft).

## Connecting Front and Rear Frames

1. Install spacer (39) in upper outer seal housing (32), as noted on removal.

2. Smear bearing and pin bores with Extreme Pressure Lithium Complex No. 2 grease (23).

3. Attach suitable lifting equipment to pivot/rear frame assembly. Lifting equipment must prevent pivot from oscillating and be capable of pulling pivot/rear frame assembly to align pivot bearing bores and front frame pin bores. Raise lifting equipment to support pivot/rear frame assembly.

4. Remove blocks from rear wheels and blocking from pivot/rear frame assembly. Using lifting equipment, pull pivot/rear frame assembly to align pivot bearing bores and front frame pin bores. Block wheels and block pivot/rear frame assembly to remain level and stationary.

5. Freeze upper and lower pins (40 & 43) to ease installation.

6. Smear lower pin (43) with Extreme Pressure Lithium Complex No. 2 grease (23) and install through front frame and bearing bores.

**Note:** It may be necessary to relieve binding between the pin and pin bores by raising or lowering pivot/rear frame assembly.

7. Apply Loctite 243 (49) to threads of bolt (48) and secure lower pin (43) with bolt (48) and hardened washer (44). Tighten bolt (48) to a torque of 73 Nm (54 lbf ft).

8. Smear upper pin (40) with Extreme Pressure Lithium Complex No. 2 grease (23) and install through front frame and bearing bores.

9. Apply Loctite 243 (49) to threads of bolt (62). Secure upper pin (40) with bolt (62), washer (61), large nut (42) and washer (41). Tighten nut (42) to a torque of 1 425 Nm (1 050 lbf ft).

## Final Assembly

1. Apply parking brake by turning the hex-head on the parking brake actuator fully clockwise.

2. Remove lifting equipment from pivot/rear frame assembly.

3. Remove stands or timbers from front frame.

4. Apply Loctite 270 to the threads of capscrews used to mount driveline between transmission yoke and front yoke (17). Align match marks and install driveline. Tighten capscrews to a torque of 153 Nm (113 lbf ft).

5. Align steering cylinder bores and mounting pin bores on pivot, install pins and secure with bolts and washers. Tighten bolts to a torque of 73 Nm (54 lbf ft).

6. Remove plugs (28) from articulation bearing, grease ports and replace with lube fittings (27).

**Note:** Lube fittings (27) are stored on pad on side of pivot assembly (1).

7. Fill bearing housings with Extreme Pressure Lithium Complex No. 2 grease (23), through lube fittings (27), until excess grease starts to escape from seal housings (32 & 34).

8. Remove lube fittings (27) and reinstall plugs (28). Store lube fittings (27) on pad on side of pivot assembly (1).

9. Start engine, raise body, lower body safety prop and lower body.

10. Remove wheel blocks.

## OSCILLATION COMPONENTS

Numbers in parentheses refer to Fig. 1.

**Note:** The following procedure assumes that only components associated with oscillation require repair.

**Note:** It is necessary to disconnect the front and rear frames at the articulation point to service the oscillation components.

**Note:** It is essential that the grease used for oscillation components is Extreme Pressure Multipurpose Grease (26), as specified in Section 300-0020, LUBRICATION SYSTEM.

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

**⚠ WARNINGS**

**To prevent personal injury and property damage, be sure wheel blocks, blocking materials and lifting equipment are properly secured and of adequate capacity to do the job safely.**

**⚠ When necessary to drive out or drive on components during disassembly/assembly, be sure to use a soft drift to prevent property damage and personal injury.**

**⚠ Hydraulic fluid pressure will remain within the braking system after engine shut down. Operate the treadle pedal continuously until the pressure has dissipated before carrying out any work on the braking system or serious injury could result.**

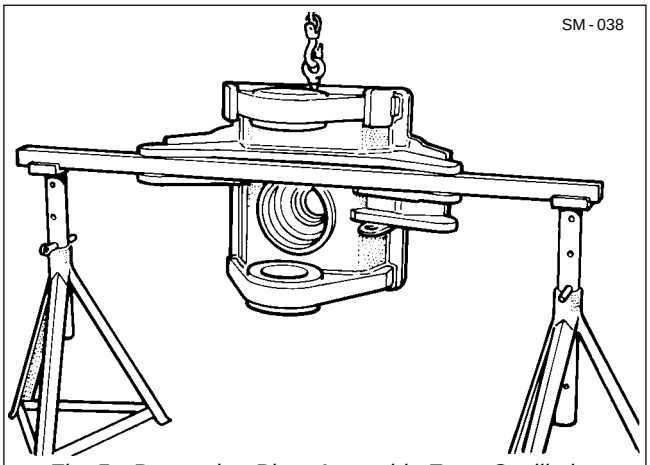



*Fig. 5 - Preventing Pivot Assembly From Oscillating*

### Disconnecting Front and Rear Frames

1. Position the vehicle on a level work area and apply parking brake.

2. Raise body and install body safety prop to secure body in partially raised position.

3. Shut down engine and block all wheels securely.

4. Depress and release brake pedal continuously to relieve the pressure in the braking system.

5. Carefully loosen brake lines at base of both accumulators to check that the pressure has released. Re-tighten brake lines.

6. Tag all hydraulic lines and electrical wiring between front and rear frames to ensure correct assembly/ installation. Disconnect all hydraulic lines and plug openings to prevent ingress of dirt. Disconnect electrical wiring and any other attachments which could be damaged on separation of front and rear frames.

7. Identify the relationship of the driveline caps to the transmission yoke and front yoke (17). Remove capscrews and remove driveline from the vehicle.

8. Support tractor frame at front and rear with suitably placed stands or timbers to keep the frame level during and after pin removal.

9. Remove bolts, washers and pins securing steering cylinders to pivot. Secure steering cylinders clear of pivot.

10. Release the parking brake by turning the hex-head on the parking brake actuator fully anticlockwise.

**⚠ WARNING**
**Tensioned spring on adjuster.**

11. Attach suitable lifting equipment to pivot/rear frame assembly. Lifting equipment must prevent pivot from oscillating after separation, and, be capable of pulling pivot/rear assembly clear of front frame. Raise lifting equipment to support pivot/rear frame assembly.

12. Remove bolt, washer, large nut (42) and washer (41) securing upper pin (40).

13. Remove upper pin (40). If necessary tap upper pin (40) to ease removal taking care to avoid damaging the threads.

**Note:** It may be necessary to relieve binding between the pin and pin bores by raising or lowering the pivot/ rear frame assembly.

14. Remove bolt (48) and hardened washer (44) securing lower pin (43).

15. Remove lower pin (43). If necessary tap lower pin (43) to ease removal taking care to avoid damaging the pin.

16. Remove blocks from rear wheels and use lifting equipment to pull pivot/rear frame assembly clear of the front frame. After moving, block pivot/rear frame assembly and block the wheels.

17. Remove spacer (39) noting orientation to ensure correct installation. Cover articulation bearings to prevent ingress of dirt.

## Disassembly

1. Remove protective guard (if fitted) from beneath parking brake disc by removing mounting hardware securing guard to the rear frame. Refer to Section 170-0010, PARKING BRAKE AND MOUNTING.

2. Remove mounting hardware securing parking brake assembly to mounting bracket on frame. Remove and secure parking brake assembly clear of brake disc.

3. Identify the relationship of the driveline caps to brake yoke (18). Remove capscrews, disconnect driveline and secure clear of brake yoke (18).

4. Remove mounting hardware securing parking brake disc to brake yoke (18) and remove brake disc.

5. Place a suitable container under rear brake yoke (18) to catch oil released when pulling brake yoke (18) from driveshaft (14).

6. Remove Rear bolts (19), Lockplate (16) & Rear thrust collar (63). Pull brake yoke (18) from driveshaft (14) .

7. Remove adaptor (57), connector (58), elbow (59) and pipe assembly (60) from oscillation hub.

8. Remove bolts (22) and washers (21) securing locking plate (12). Remove locking plate (12).

9. Restrain pivot assembly (1) to prevent it oscillating, by placing a heavy bar between the steering cylinder mountings. Lock the bar in position using suitable trestles or stands. See Fig. 5.

10. Using a suitable tool, remove thrust nut (11). If wear area of thrust nut (11) is damaged, replace thrust nut (11).
11. Insert an M20 eyebolt into tapped pad provided on top of pivot assembly (1) and attach suitable lifting equipment.
12. Remove pivot restraining bar.

13. Using lifting equipment, carefully pull pivot assembly (1) clear of oscillation hub. Place pivot assembly (1) in a suitable work area for further disassembly.

14. Note position of front 'V' ring (10) to aid in 'Installation'. Remove and discard 'V' ring (10).

15. Inspect nylon oscillation bushes (2) as described in 'Inspection'. If bushes are to be renewed, proceed with step 16.

16. Remove nylon oscillation bushes (2) with hammer and chisel.

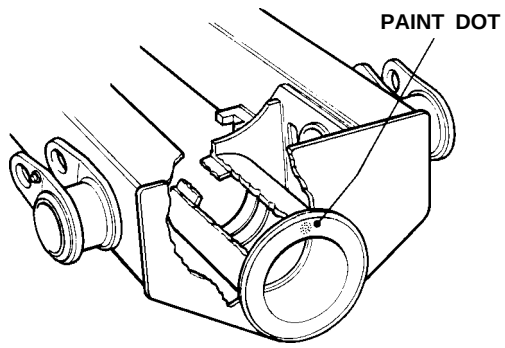



*Fig. 6 - Installing Oscillation Bushes*

**Note:** The suggested method is to make an axial cut along the bush then to lever the bush in order to collapse it upon itself.

## Inspection

1. Clean nylon oscillation bushes with a suitable solvent and allow to dry.

2. Inspect nylon oscillation bushes for wear, scoring, erosion and 'out of round'. Pay particular attention to the thrust faces of the bushes which should also be inspected for cracking/splitting. Renew if required.

3. Replace all seals with new parts.

## Assembly

Numbers in parentheses refer to Fig. 1.

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

**⚠ WARNING**
**To prevent personal injury and property damage, be sure wheel blocks are properly secured and of adequate capacity to do the job safely.**

1. Wipe bush housing clean using a suitable solvent and allow to dry.

2. Apply Loctite 648 (3) and Loc Quick Primer (4) and align new bushes (2) to housing with grease holes aligned vertically and identification 'PAINT DOT' at Top Dead Centre. Refer to Fig. 6. Drift bushes (2) into housing using hammer with soft packing for protection.

3. Install plug (25) in filler/level hole on pivot assembly (1). Install gasket (5) and cover plate (6) on side of oscillation hub and secure with bolts (7) and washers (20).

4. Install plug (25) in cavity drain port on underside of oscillation hub.

5. Install plugs (28) into oscillation bearing grease ports.

6. Lightly coat 'V' ring (10) and machined surfaces of pivot with Extreme Pressure Multipurpose Grease (26) and, install 'V' ring (10), with lip towards rear, on front of oscillation hub.

7. Using suitable lifting equipment, and taking care to prevent damaging bushes (2) or pivot threads, install pivot assembly (1) into rear frame.

8. Lightly coat 'V' ring (10) and machined surfaces of pivot with Extreme Pressure Multipurpose Grease (26) and, install 'V' ring (10), with lip towards front, on rear of oscillation hub.

9 . a) Restrain pivot assembly (1) to prevent it oscillating, by placing a heavy bar between the steering cylinder mountings. Lock the bar in position using suitable trestles or stands. See Fig. 5.

b) Secure a suitable tool to pivot thrust nut (11) and tighten thrust nut (11) until there is no end float/ clearance at thrust face of either bush. Slacken thrust nut (11) until pin of the locking plate (12) can be inserted in the first available hole in the thrust nut (11).

c) Secure locking plate (12) with bolts (22) and lockwashers (21). Torque tighten bolts (22) to 94 Nm (69 lbf ft).

10. Install adaptor (57), connector (58), elbow (59) and pipe assembly (60) to oscillation hub.

11. Install brake yoke (18) on driveshaft (14) until it butts against bearing assembly cup and cone (8 & 9).

12. Install parking brake disc on brake yoke (18) and secure with bolts, washers and nuts. Tighten bolts to a torque of 73 Nm (54 lbf ft).

13. Install rear of driveshaft (14).

14. install Brake yoke (18) , Rear thrust collar (63) ensuring 'O'-rings (29& 51) are in place , shim pack (64) and bolts (19).

15. Lock off Brake yoke flange as before (18) with suitable clamping method. Torque bolts (19) to 73 Nm (lbf ft)

16. Take a magnetic clock gauge located on the flange of pivot casing , needle acting on Rear thrust collar (63) end face. Check Brake yoke (18) float movement. Ensure still within range 0.05mm - 0.15mm (0.002" - 0.006").
17. If float is incorrect, alter arrangement of shim pack (64) to bring within size.

18. Using special mandrel (15270104) home locking plate (16) onto bolts (19). Remove clamping bar.

## Connecting Front and Rear Frames

1. Install spacer (39) in upper bearing assembly (30) as noted on removal.

2. Smear bearing assembly (30) and pin bores with Extreme Pressure Lithium Complex No. 2 grease (23).

3. Attach suitable lifting equipment to pivot/rear frame assembly. Lifting equipment must prevent pivot from oscillating and be capable of pulling pivot/rear frame assembly to align pivot bearing bores and front frame pin bores. Raise lifting equipment to support pivot/rear frame assembly.

4. Remove blocks from rear wheels and blocking from pivot/rear frame assembly. Using lifting equipment, pull pivot/rear frame assembly to align pivot bearing bores and front frame pin bores. Block wheels and block pivot/rear frame assembly to remain level and stationary.

5. Freeze upper and lower pins (40 & 43) to ease installation.

**Note:** It may be necessary to relieve binding between the pin and pin bores by raising or lowering pivot/rear frame assembly.

6. Smear lower pin (43) with Extreme Pressure Lithium Complex No. 2 grease (23) and install through front frame and bearing bores.

7. Apply Loctite 243 (49) to threads of bolt (48). Secure lower pin (43) with bolt (48) and hardened washer (44). Tighten bolt (48) to a torque of 73 Nm (54 lbf ft).

8. Smear upper pin (40) with Extreme Pressure Lithium Complex No. 2 grease (23) and install through front frame and bearing bores.

9. Apply Loctite 243 (49) to threads of bolt (62). Secure upper pin (40) with bolt (62), washer (61), washer (41) and large nut (42). Tighten nut (42) to a torque of 1 425 Nm (1 050 lbf ft).

## Final Assembly

1. Install parking brake assembly to mounting brackets and secure with bolts, washers and nuts. Refer to Section 170-0010, PARKING BRAKE AND MOUNTING.

2. Apply parking brake by turning the hex-head on the parking brake actuator fully clockwise.

**⚠ WARNING**
**Tensioned spring on adjuster.**

3. Remove lifting equipment from pivot/rear frame assembly.

4. Remove stands or timbers from front frame.

5. Apply Loctite 270 to threads of capscrews used to mount driveline between transmission yoke and front yoke (17). Align match marks and install driveline. Tighten capscrews to a torque of 153 Nm (113 lbf ft).

6. Align match marks and reconnect driveline to brake yoke (18). Tighten capscrews to a torque of 153 Nm (113 lbf ft).

**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.

7. Align steering cylinder bores and mounting pin bores on pivot. Install pins and secure with bolts and washers. Tighten bolts to a torque of 73 Nm (54 lbf ft).

8. Connect hydraulic lines and electrical wiring as noted on disassembly.

9. Remove bolts (7), washers (20), gasket (5) and cover plate (6) from side of oscillation hub to gain access to filler/level plug (25) on pivot assembly (1). Remove filler/level plug (25).

10. Add SAE 80W - 90 E. P. gear oil (24) through filler/level hole in pivot assembly (1) until the oil is level with the bottom of filler/level hole.

11. Remove plug (25) from underside of oscillation hub to drain the cavity between the oscillation hub and pivot assembly (1) of any oil that entered while filling the driveshaft bearing housing.

12. Install plug (25) in filler/level hole on pivot assembly (1). Install gasket (5) and cover plate (6) on side of oscillation hub, secure with bolts (7) and washers (20).

13. Install plug (25) in cavity drain port on underside of oscillation hub.

14. Remove plugs (28) from articulation bearing grease ports and replace with lube fittings (27).

**Note:** Lube fittings (27) are stored on pad on side of pivot assembly (1).

15. Fill bearing housings with Extreme Pressure Lithium Complex No. 2 grease (23) through lube fittings (27) until excess grease starts to escape from seal housings (32 & 34).

16. Remove lube fittings (27) and reinstall plugs (28). Store grease fittings (27) on pad on side of pivot assembly (1).

17. Add Extreme Pressure Multipurpose grease (26) to oscillation bushing lube fittings (55) on top of oscillation hub. Lube until excess grease in seen.

18. Install parking brake disc protective guard (if fitted) and secure with bolts, washers and nuts. Tighten nuts to a torque of 73 Nm (54 lbf ft).

19. Start engine to charge hydraulic systems, raise body, lower body safety prop and lower the body.

20. Bleed the braking system as described in Section 165-0010, BRAKE PARTS.

21. Remove wheel blocks.

## MAINTENANCE

Numbers in parentheses refer to Fig. 1.

Every 250 hours, oscillation bushes must be lubricated. Add Extreme Pressure Multipurpose grease (26) to oscillation bushing lube fittings (55) on top of oscillation hub. Lube until excess grease in seen.

> ⚠ **WARNING**
> **To prevent personal injury and property damage, be sure wheel blocks are properly secured and of adequate capacity to do the job safely.**

Every 250 hours, check the end float/clearance at the thrust face of the oscillation bushes. Any clearance found must be removed by adjustment of the thrust nut, as described in step 9 of 'Assembly' procedure.

**Note:** A practical method of establishing the effective adjustment of the thrust nut is to use movement of the machines body in the raised position. Move the body from fully raised to almost fully raised while watching the effect of this action on the frame and pivot arrangement. Any slackness between the thrust nut and thrust faces will be clearly visible movement of the frame.

Every 1 000 hours (6 months), follow the procedure given below to check the oil level in the driveshaft bearing housing, and, lubricate the articulation and oscillation bearings.

**Note:** It is essential that the grease used for articulation components is Extreme Pressure Lithium Complex No. 2 grease (23), as specified in Section 300-0020, LUBRICATION SYSTEM.

1. Position the vehicle on a level work area and apply parking brake.

2. Raise body and install body safety prop to secure body in partially raised position.

3. Shut down engine and block all wheels securely.

4. Remove protective guard (if fitted) from beneath parking brake disc by removing nuts, washers and bolts securing guard to rear frame.

5. Remove bolts (7), washers (20), gasket (5) and cover plate (6) from side of oscillation hub to gain access to filler/level plug (25) on pivot assembly (1). Remove filler/level plug (25).

6. Add SAE 80W - 90 E. P. gear oil (24) through filler/level hole in pivot assembly (1) until the oil is level with the bottom of filler/level hole.

7. Remove plug (25) from underside of oscillation hub to drain the cavity between the oscillation hub and pivot assembly (1) of any oil that entered while filling the driveshaft bearing housing.

8. Install plug (25) into filler/level hole on pivot assembly (1). Install gasket (5) and cover plate (6) on side of oscillation hub, secure with bolts (7) and washers (20).

9. Install plug (25) into cavity drain port on underside of oscillation hub.

10. Remove plugs (28) from articulation bearing grease ports and replace with lube fittings (27).

**Note:** Lube fittings (27) are stored on pad on side of pivot assembly (1).

11. Fill bearing housings with Extreme Pressure Lithium Complex No. 2 grease (23) through lube fittings (27) until excess grease starts to escape from seal housings (32 & 34).

12. Remove lube fittings (27) and reinstall plugs (28). Store grease fittings (27) on pad on side of pivot assembly (1).

13. Add Extreme Pressure Multipurpose grease (26) to oscillation bushing lube fittings (55) on top of oscillation hub. Lube until excess grease in seen.

14. Install parking brake disc protective guard (if fitted) and secure with bolts, washers and nuts. Torque tighten nuts to 73 Nm (54 lbf ft).

15. Start engine, raise body, lower body safety prop and lower body.

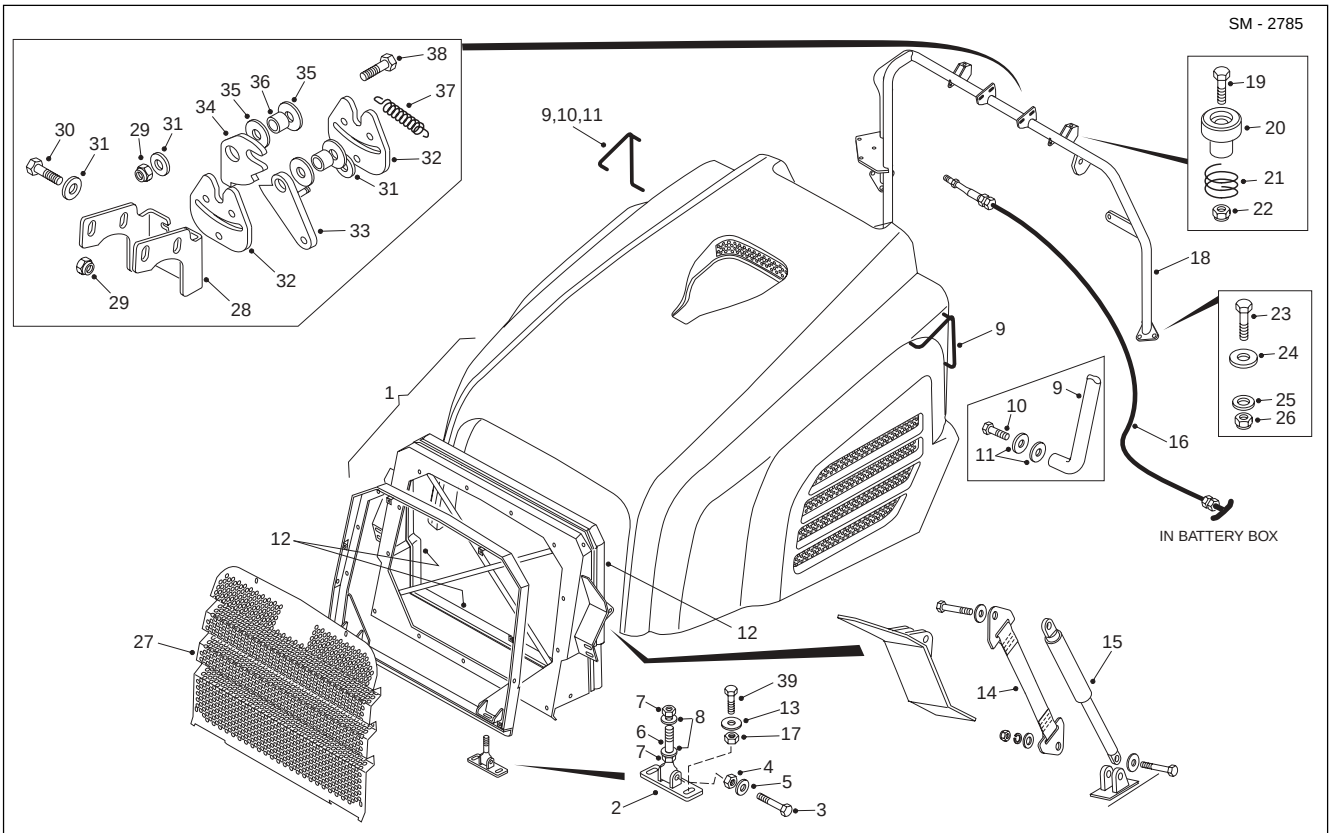
16. Remove wheel blocks.

## SPECIAL TOOLS

Refer to Section 300-0070, SERVICE TOOLS, for part numbers of the thrust nut tool and general service tools and adhesives required for procedures outlined in this section. These tools and adhesives are available from your dealer.

| SPECIAL TORQUE SPECIFICATIONS | | | | |
|---|---|---|---|---|
| | | | TORQUE | |
| FIG. No. | ITEM No. | ITEM NAME | Nm | lbf ft |
| 1 | 19 | Nut (to seat bearing only) | 250 | 180 |
| 1 | 22 | Bolt | 94 | 69 |
| 1 | 42 | Nut | 1 425 | 1 050 |
| 1 | 46 & 47 | Bolt | 94 | 68 |
| 1 | 48 | Bolt | 73 | 54 |
| - | - | Parking Brake Disc Bolts | 73 | 54 |
| - | - | Parking Brake Brkt Mounting Nuts | 680 | 490 |
| - | - | Driveline Mounting Capscrews | 153 | 113 |
| - | - | Protective Guard Mounting Nuts | 73 | 54 |
| - | - | Steering Cylinder Pin Bolts | 73 | 54 |

* * * *




1 - Hood Assembly
2 - Hinge Assembly
3 - Bolt
4 - Nut
5 - Washer
6 - Adjustment Rod
7 - Nut
8 - Hardened Washer
9 - Hood Handle
10 - Bolt
11 - Washer
12 - Seal
13 - Washer
14 - Hood Retaining Strap
15 - Gas Strut
16 - Hood Catch Cable
17 - Nut
18 - Goalpost Assembly
19 - Bolt
20 - Hood Stop
21 - Spring
22 - Locknut
23 - Bolt
24 - Hardened Washer
25 - Washer
26 - Locknut
27 - Grille
28 - Bracket
29 - Nut
30 - Bolt
31 - Washer
32 - Plate
33 - Cam Plate Assembly
34 - Cam Plate Assembly
35 - Washer
36 - Bush
37 - Spring
38 - Bolt
39 - Bolt

*Fig 1 - Hood and Mounting*

## HOOD

### Removal

Numbers in parentheses refer to Fig. 1.

**⚠ WARNING**
**To prevent personal injury and property damage, be sure blocking materials and lifting equipment are properly secured and of adequate capacity to do the job safely.**

1. Position the machine on a level surface, 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. Remove bolts, washers, lockwashers and nuts securing grille (27) to grille subframe. Secure grille (27) clear of hood (1).

4. Pull cable assembly (16), handle inside battery box, to release hood catch and lift up hood (1). Secure hood (1) in raised position using suitable lifting equipment.

5. Carefully remove bolts, washers and nuts securing hood retaining straps (14) and gas struts (15).

Remove fasteners, hood retaining straps (14) and gas struts (15) from hood (1).

6. Remove bolts (39), washers (13) and nuts (17) securing hinge assemblies (2) to frame. Carefully lift hood (1) assembly from the machine.

7. If required, remove mounting hardware securing grille subframe to hood (1). Secure grille subframe clear of hood (1).

8. If required, remove bolts (10) and washers (11) securing handles (9) to hood (1). Secure handles (9) clear of hood (1).

### Installation

Numbers in parentheses refer to Fig. 1.

**Note:** Tighten all fasteners to torques listed in Section 300-0080, STANDARD BOLT AND NUT TORQUE SPECIFICATIONS.

**WARNING**
**To prevent personal injury and property damage, be sure blocking materials and lifting equipment are properly secured and of adequate capacity to do the job safely.**

1. If removed, secure handles (9) to hood (1) using bolts (10) and washers (11).

2. If removed, secure grille subframe to hood (1) using mounting hardware as removed at 'Removal'.

3. Using suitable lifting equipment, lift and position hood (1) on the machine and align holes in hinge assemblies (2) with mounting holes on frame. Secure hood (1) using bolts (39), washers (13) and nuts (17).

4. Carefully install hood straps (14) and gas struts (15) using mounting hardware as removed at 'Removal'.

5. With lifting equipment still in place, lower hood (1) to match with goalpost support assembly (18). Remove lifting equipment.

6. If required, adjust fitment of hood (1) to frame at hinge assemblies (2) and adjustment rod (6).

7. Install grille (27) to hood (1) and secure using bolts, washers, lockwashers and nuts.

8. Remove wheel blocks.

## GOALPOST SUPPORT ASSEMBLY

### Removal

Numbers in parentheses refer to Fig. 1.

**WARNING**
**To prevent personal injury and property damage, be sure blocking materials and lifting equipment are properly secured and of adequate capacity to do the job safely.**

1. Position the machine on a level surface, 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. Pull cable assembly (16), handle inside battery box, to release hood catch and lift up hood (1). Secure hood (1) in raised position.

4. Remove mounting hardware securing washer bottle to mounting bracket on the left hand side of goalpost support assembly (18). Secure washer bottle clear of goalpost support assembly (18).

5. Remove plate and mounting hardware securing transmission oil cooler to goalpost support assembly (18). If required, disconnect transmission oil cooler hoses.

6. Remove mounting hardware securing air cleaner intake tube to goalpost support assembly (18).

7. With a suitable container available to catch leakage, remove drain plug from radiator header tank and drain coolant. Apply Loctite 225 to drain plug and reinstall in header tank.

8. Ensure all cooling lines connected to header tank are identified for ease of installation and with suitable containers available to catch leakage, disconnect cooling lines. Fit blanking caps to all open lines.

9. Disconnect electrical harness from coolant level sensor in header tank. Note routing of all hoses and harnesses attached to and through goalpost support assembly (18) and disconnect.

10. Disconnect hood cable (16) ball joint from cam plate assembly (33) and secure cable (16) clear of hood catch mechanism.

11. Check to make certain that all necessary line and