TEREX

TEREX Equipment Limited Maintenance Manual

MAINTENANCE MANUAL TA250 - TA300

CLICK HERE FOR TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK

TEREX

TEREX Equipment Limited Maintenance Manual Re-order

MAINTENANCE MANUAL

TA250 - TA300

Issued by;
Customer Support Department
Terex Equipment Limited
Newhouse Industrial Estate
Motherwell, ML1 5RY
Scotland

Tel; +44 (0) 1698 732121
Fax; +44 (0) 1698 503210

www.terex.com

Technical Assistance:
http://constructionsupport.terex.com

SM957/963

Re-order Part Number
15504632

Revision: August 2011

15504632
SM957/963

THIS PAGE IS INTENTIONALLY BLANK

TEREX

TEREX Equipment Limited Maintenance Manual - Introduction

MAINTENANCE MANUAL

TA250 - TA300

For further information on the subject matter detailed within this Maintenance Manual, please refer to Terex Equipment Limited Operator Handbooks and Product Parts Books.

Alternatively, please contact;

Customer Support Department
Terex Equipment Limited
Newhouse Industrial Estate
Motherwell, ML1 5RY

Tel; +44 (0) 1698 732121
Fax; +44 (0) 1698 503210

Please refer to TEREX Specification Sheets or consult Factory Representatives to ensure that information is current.

15504632
SM957/963

THIS PAGE IS INTENTIONALLY BLANK

IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all motor vehicles. The service procedures recommended and described in this publication, are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when, and as recommended.

It is important to note that this publication contains various WARNINGS and NOTES which should be carefully read in order to minimize the risk of personal injury to personnel, or the possibility that improper service methods will be followed which may damage the vehicle or render it unsafe. It is also important to understand these WARNINGS and NOTES are not exhaustive. It is not possible to know, evaluate and advise the service trade of ALL conceivable ways in which service might be carried out, or, of the possible hazardous consequences of each way. Consequently, no such broad evaluation has been undertaken. Accordingly, anyone who uses a service procedure, or tool, which is not recommended, must first satisfy themselves thoroughly that neither their safety, nor vehicle safety, will be jeopardized by the service method he/she selects.

Safety Alert Symbol
The safety alert symbol is used to alert you to a potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Hazard Classification
A multi-tier hazard classification system is used to communicate potential personal injury hazards. The following signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard. Signal words used without the safety alert symbol relate to property damage and protection only. All are used as attention getting devices throughout this manual as well as on deals and labels fixed to the machinery to assist in potential hazard recognition and prevention.

DANGER	**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	**WARNING** indicates an potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	**CAUTION** indicates an potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	**CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

WARNING
Never use parts which are altered, modified, or weakened in operation. This can seriously jeopardise the integrity of the machine and could result in property damage or serious personal injury.

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

* * * *

THIS PAGE IS INTENTIONALLY BLANK

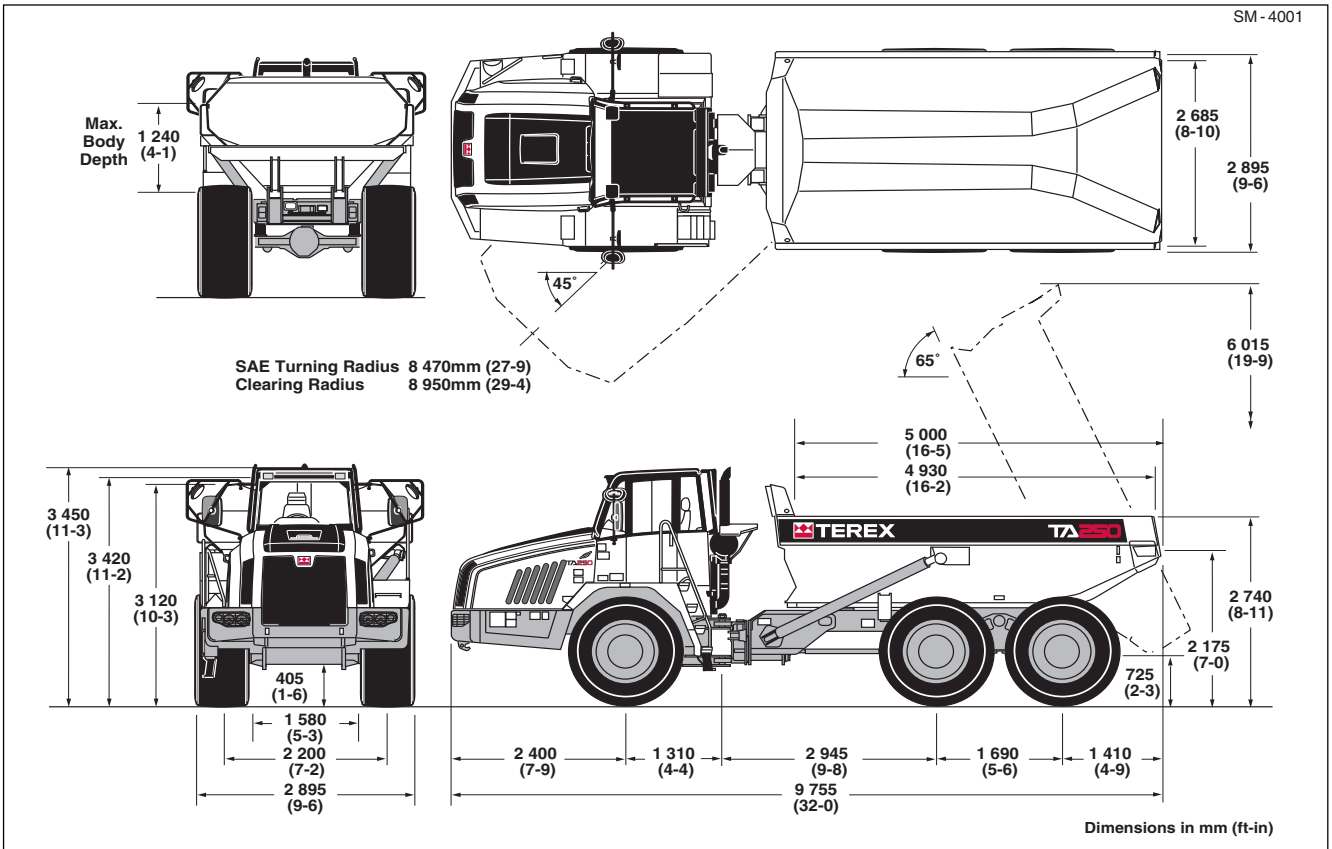


Fig. 1 - Machine Dimensions

ENGINE

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

Gross power at 1800 rev/min ..... 272 kW (365 hp)
Net power at 2100 rev/min ..... 238 kW (319 hp)

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 ..... 1673 Nm (1234 lbf ft) at 1400 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) ..... 2350 rev/min
Maximum Speed (Full load) ..... 2100 rev/min
Idle Speed ..... 750 rev/min

TRANSMISSION

Make/Model ..... ZF 6WG 260 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. Optional 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) ..... 14 ± 1 bar (190 ± 15 lbf/in²)
- Converter 'IN' ..... 10.5 bar (152 lbf/in²) at 2300 rev/min
- Converter 'OUT' ..... 4.8 bar (70 lbf/in²) at 2300 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 ..... 1718 ± 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 TA250(957)

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.

Transverse differential locks are activated by a request from the foot operated switch.

Ratios:

Differential 3.875:1
Planetary 5.71:1
Total Reduction 22.12:1

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**	4.35 bar (63 lbf/in²)	4.35 bar (63 lbf/in²)
750/65 R25**	3 bar (44 lbf/in²)	3 bar (44 lbf/in²)

Inflation Pressures (Michelin):

	Front	Rear
23.5 R25**	3.5 bar (51 lbf/in²)	3.5 bar (51 lbf/in²)
750/65 R25**	2.75 bar (40 lbf/in²)	2.75 bar (40 lbf/in²)

Inflation Pressures (Pirelli):

	Front	Rear
23.5 R25**	4.3 bar (62 lbf/in²)	4.3 bar (62 lbf/in²)

Inflation Pressures (Continental):

	Front	Rear
23.5 R25**	4.25 bar (62 lbf/in²)	4.25 bar (62 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 2100 rev/min ..... 4.9 l/s (77.4 US gal/min)

Brakes

Full hydraulic braking system with enclosed, oil-immersed multiple discs on each wheel. 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 ..... 60 ± 5.2 bar (870 ± 75 lbf/in²)

Braking surface (tractor) ..... 22000 mm² (34.1 in²)/brake
Braking surface (trailer) ..... 22000 mm² (34.1 in²)/brake

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.

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 (3500 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 V, 143 Ah each
Accessories ..... 24 V
Alternator ..... 70 Amp

BODY

Of all welded construction, fabricated from high hardness (min. 360 BHN) 1000 MPa (145000 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) ..... 12.5 m³ (16.4 yd³)
- Heaped 2:1 (SAE) ..... 15.5 m³ (20.3 yd³)

SERVICE CAPACITIES

Fuel tank ..... 390 l (103 US gal)
Hydraulic System ..... 202 l (53.4 US gal)
Engine Crankcase and filters ..... 34 l (9.0 US gal)
Cooling System ..... 55 l (14.5 US gal)
Transmission (including cooler) ..... 63 l (16.6 US gal)
Differentials - Front & Rear (each) ..... 28 l (7.4 US gal)
Differential - Centre ..... 31 l (8.2 US gal)
Planetaries - Front ..... 11 l (3.0 US gal)
Planetaries - Centre & Rear (each) ..... 7.5 l (2.0 US gal)
Hand Pump Tank ..... 1 l (0.26 US gal)
Air Conditioning Compressor ..... 0.125 l (0.033 US gal)

VIBRATION AND SOUND INFORMATION

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

*Exterior Sound Rating (ISO 6395) ..... 108 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.

Hand and Arm Vibration

The weighted root mean square acceleration to which the hand and arms of the operator are exposed is less than 2.5 m/s² under normal operating conditions.

Whole Body Vibration

Under simulated field duty cycle, the weighted root mean square acceleration emission of the machine to which the body is subjected is less than 0.5 m/s².

Note 1: Whole body vibrations on construction machines are influenced by many factors independent of machine design, for example ground conditions, working methods, correct seat adjustment, operator input to vehicle speed. It is therefore not possible to state one single value which is representative of operator's exposure to whole body vibrations.
The single whole-body emission value listed above is determined under particular operating and terrain conditions. In accordance with EN474 it is not intended to be used to determine the whole-body vibration exposure to the operator using this machine.

Note 2: It is recognized that the appropriate design of operator's seat is the most effective construction measure to minimize the whole-body vibration emission of a particular machine family.

This machine is equipped with an operator's seat which meets the criteria of EN ISO 7096 representing vertical vibration under severe operating conditions.

The seat in this machine has been tested with input spectral class EM1 and has a seat transmissibility factor SEAT >1.1.

Vehicle Weights	23.5 R25 Tyres	
Standard Vehicle	**kg**	**lb**
Net Distribution		
Front Axle	11724	25793
Centre Axle	5205	11451
Rear Axle	5276	11709
Vehicle, Net	**22205**	**48953**
Payload	**25000**	**55115**
Gross Distribution		
Front Axle	15880	34936
Centre Axle	15592	34302
Rear Axle	15733	34830
Vehicle, Gross	**47205**	**104068**
Bare Chassis	17335	38213
Body	4100	9040
Body Hoists (Pair)	530	1 170

Ground Pressures		
At 15% sinkage of unloaded radius and specified weights		
23,5 R25	**Net**	**Loaded**
Front	118 kPa (17.1 psi)	161 kPa (23.3 psi)
Rear	53 kPa (7.6 psi)	158 kPa (22.9 psi)
750/65 R25	**Net**	**Loaded**
Front	87 kPa (12.6 psi)	119 kPa (17.3 psi)
Rear	40 kPa (5.8psi)	119 kPa (17.3 psi)

* * * *

THIS PAGE IS INTENTIONALLY BLANK

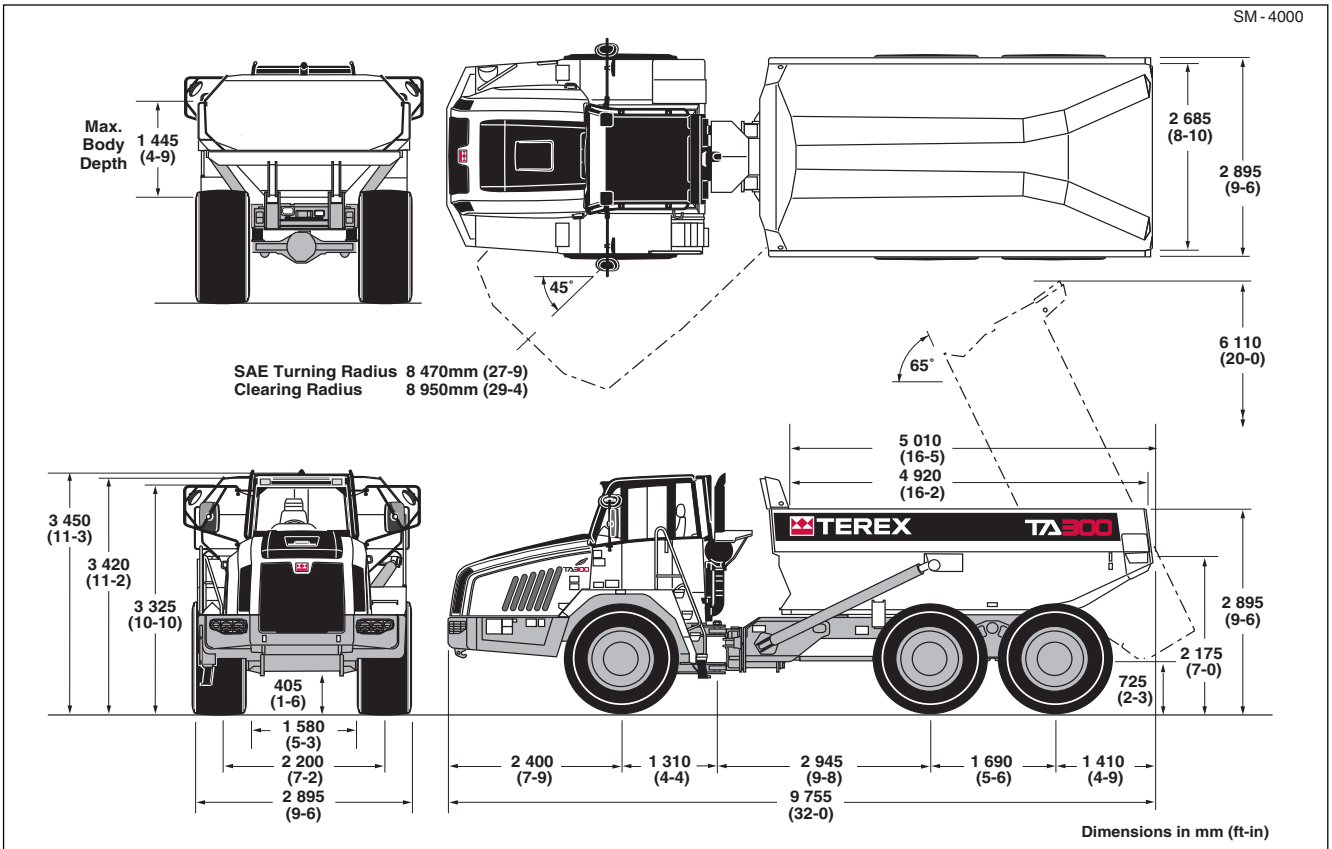


Fig. 1 - Machine Dimensions

ENGINE

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

Gross power at 1800 rev/min ..... 287 kW (385 hp)
Net power at 2100 rev/min ..... 248 kW (333 hp)

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 ..... 1775 Nm (1309 lbf ft) at 1400 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 l (661 in³)
Air cleaner ..... Dry type, double element
Starting ..... Electric
Maximum Speed (No load) ..... 2350 rev/min
Maximum Speed (Full load) ..... 2100 rev/min
Idle Speed ..... 750 rev/min

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 2300 rev/min
- Converter 'OUT' ..... 4.8 bar (70 lbf/in²) at 2300 rev/min
- Converter Relief Valve ..... 8.5 bar (123 lbf/in²)
- Retarder ..... 5.5 bar (80 lbf/in²)

Temperatures:
- Normal ..... 80 °C - 110 °C (176 °F - 230 °F)
- Maximum (Retarder Mode) ..... 145 °C (293 °F)

Stall Speed ..... 1805 ± 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

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.

Transverse differential locks are activated by a request from the foot operated switch. Locking of transverse differential locks is actuated simultaneously with the transmission output differential lock.

Ratios:
- Differential 3.875:1
- Planetary 5.71:1
- Total Reduction 22.12:1

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 l/s (77.4 US gal/min)

Brakes

Full hydraulic braking system with enclosed, oil-immersed multiple discs on each wheel. 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 ..... 60 ± 5.2 bar (870 ± 75 lbf/in²)

Braking surface (tractor) ..... 22000 mm² (34.1 in²)/brake
Braking surface (trailer) ..... 22000 mm² (34.1 in²)/brake

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.

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 (3200 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 V, Negative Ground
Battery ..... Two, 12 V, 143 Ah each
Accessories ..... 24 V
Alternator ..... 70 Amp

BODY

Of all welded construction, fabricated from high hardness (min. 360 BHN) 1000 MPa (145000 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 l (103 US gal)
Hydraulic System ..... 202 l (53.4 US gal)
Engine Crankcase and filters ..... 34 l (9.0 US gal)
Cooling System ..... 55 l (14.5 US gal)
Transmission (including cooler) ..... 63 l (16.6 US gal)
Differentials - Front & Rear (each) ..... 28 l (7.4 US gal)
Differential - Centre ..... 31 l (8.2 US gal)
Planetaries - Front ..... 11 l (3.0 US gal)
Planetaries - Centre & Rear (each) ..... 7.5 l (2.0 US gal)
Hand Pump Tank ..... 1 l (0.26 US gal)
Air Conditioning Compressor ..... 0.125 l (0.033 US gal)

VIBRATION AND SOUND INFORMATION

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

*Exterior Sound Rating (ISO 6395) ..... 109 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.

Hand and Arm Vibration

The weighted root mean square acceleration to which hand and arms of the operator are exposed is less than 2.5m/s² under normal operating conditions?

Whole Body Vibration

Under simulated field duty cycle, the weighted root mean square acceleration emission of the machine to which the body is subjected is less than 0.5 m/s².

Note 1: Whole body vibrations on construction machines are influenced by many factors independent of machine design e.g ground conditions, working methods, correct seat adjustment, operator input to vehicle speed.

It is therefore not possible to state one single value which is representative of operator's exposure to whole body vibrations.
The single whole-body emission value listed above is determined under particular operating and terrain conditions. In accordance with EN474 it is not intended to be used to determine the whole-body vibration exposure to the operator using this machine.

Note 2: It is recognized that the appropriate design of operator's seat is the most effective construction measure to minimize the whole-body vibration emission of a particular machine family.

This machine is equipped with an operator's seat which meets the criteria of EN ISO 7096 representing vertical vibration under severe operating conditions.

The seat in this machine has been tested with input spectral class EM1 and has a seat transmissibility factor SEAT >1.1.

Vehicle Weights	23.5 R25 Tyres	
Standard Vehicle	**kg**	**lb**
Net Distribution		
Front Axle	11753	25913
Centre Axle	5315	11718
Rear Axle	5417	11942
Vehicle, Net	**22485**	**49573**
Payload	**28000**	**61730**
Gross Distribution		
Front Axle	16821	37086
Centre Axle	16740	36904
Rear Axle	16924	37313
Vehicle, Gross	**50485**	**111303**
Bare Chassis	17555	38703
Body	4400	9700
Body Hoists (Pair)	530	1170

Ground Pressures		
At 15% sinkage of unloaded radius and specified weights		
23,5 R25	**Net**	**Loaded**
Front	119 kPa (17.2 psi)	170 kPa (24.6 psi)
Rear	54 kPa (7.8 psi)	170 kPa (24.6 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)

* * * *

THIS PAGE IS INTENTIONALLY BLANK

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.

* * * *

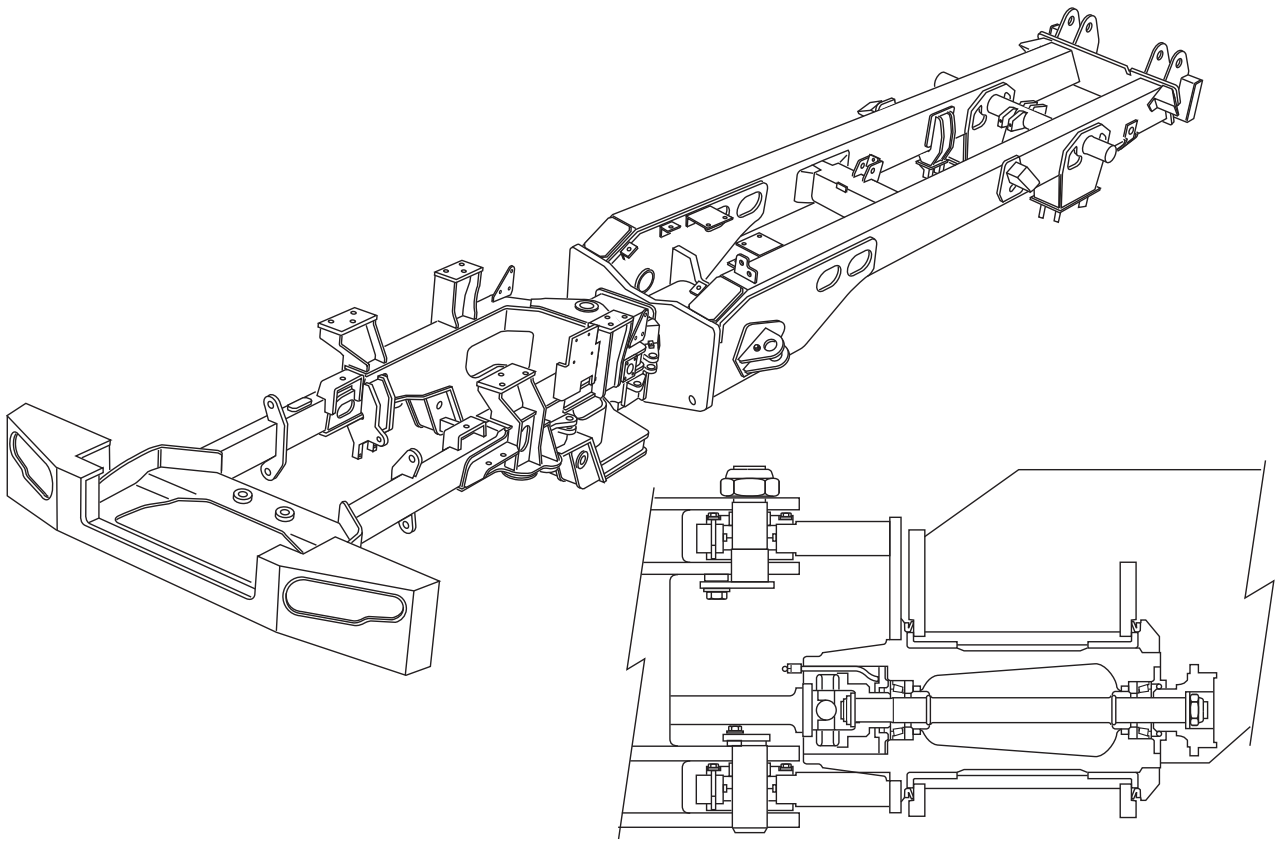


Fig. 1 - General Arrangement of Frame Assemblies

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.

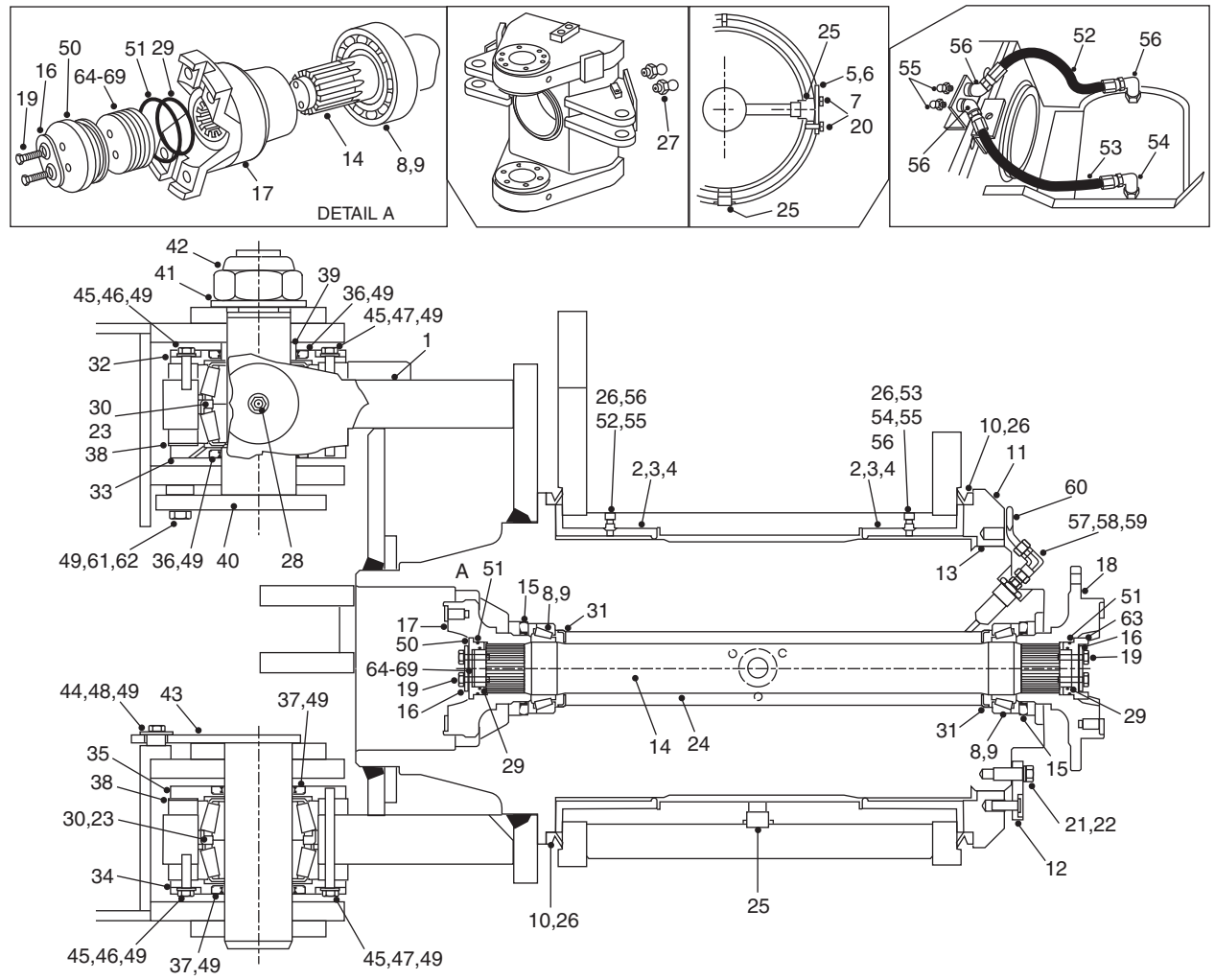
⚠ WARNING
Welding, burning, heating or dressing surfaces previously painted using polyurethane paint produces fumes which are toxic. Surfaces must be prepared using paint stripper prior to area being reworked. Recommended Industrial Hygiene and Safety Rules should be followed for protection of the welding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

* * * *

THIS PAGE IS INTENTIONALLY BLANK



1 - Pivot Assembly	16 - Lockplate	28 - Plug	43 - Lower Pin	58 - Connector
2 - Nylon Bush	17 - Front Yoke	29 - 'O' Ring	44 - Hardened Washer	59 - Elbow
3 - Loctite 648	18 - Brake Yoke	30 - Bearing Assembly	45 - Washer	60 - Pipe Assembly
4 - Loc Quick Primer	19 - Bolt	31 - Retaining Ring	46 - Bolt	61 - Washer
5 - Gasket	20 - Washer	32 - Seal Housing	47 - Bolt	62 - Bolt
6 - Cover Plate	21 - Lockwasher	33 - Seal Housing	48 - Bolt	63 - Thrust Collar-Rear
7 - Bolt	22 - Bolt	34 - Seal Housing	49 - Loctite 243	64 - Shim
8 - Bearing Assy - Cup	23 - Extreme Pressure	35 - Seal Housing	50 - Thrustcollar-Front	65 - Shim
9 - Bearing Assy - Cone	Lithium No.2 Grease	36 - Seal	51 - 'O' Ring	66 - Shim
10 - 'V' Ring Seal	24 - SAE 80W-90 EP	37 - Seal	52 - Hose Assembly	67 - Shim
11 - Thrust Nut	Gear Oil	38 - Shim	53 - Hose Assembly	68 - Shim
12 - Locking Plate	25 - Plug	39 - Spacer	54 - Connector	69 - Shim
13 - Antiseize Comp	26 - Extreme Pressure	40 - Upper Pin	55 - Lube Fitting	
14 - Driveshaft	Multipurpose Grease	41 - Washer	56 - Elbow	
15 - Seal	27 - Lube Fitting	42 - Nut	57 - Adaptor	

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), Shims (64 - 69), Front thrust collar (50) & Front yoke (17) from the drive shaft (14).

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.

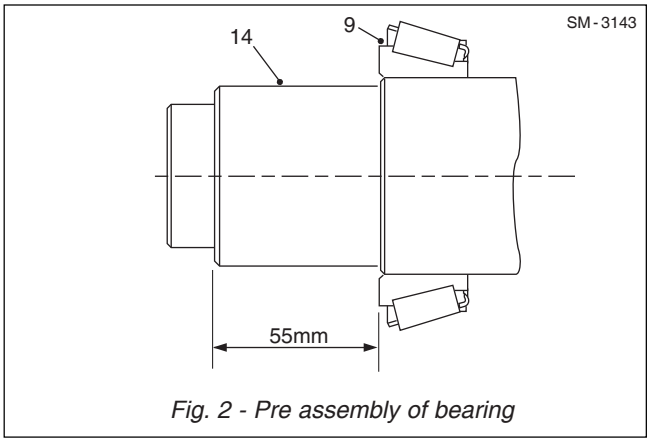


Fig. 2 - Pre assembly of bearing

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 assembly 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 Rear thrust collar (63) and slide onto the drive shaft (14).

10. Fit new 'O'-rings (29 & 51) to Rear thrust collar (63) and fit collar over stub end of driveshaft (14) (align mating holes). Fit 2 off front bolts (19).

11. Tighten Rear bolts (19) ; alternately 1/4 - 1/2 turns, drawing driveshaft (14) hard against the inner face of Rear thrust collar (63). Shaft will be visible through inspection hole on the collar.

12. Lock Rear yoke (18) from rotation by a suitable method / bar acting on the ground. Torque Front bolts (19) to 54Nm/39 lbf ft.

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

14. Slide Front 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 Rear thrust collar (63), 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.

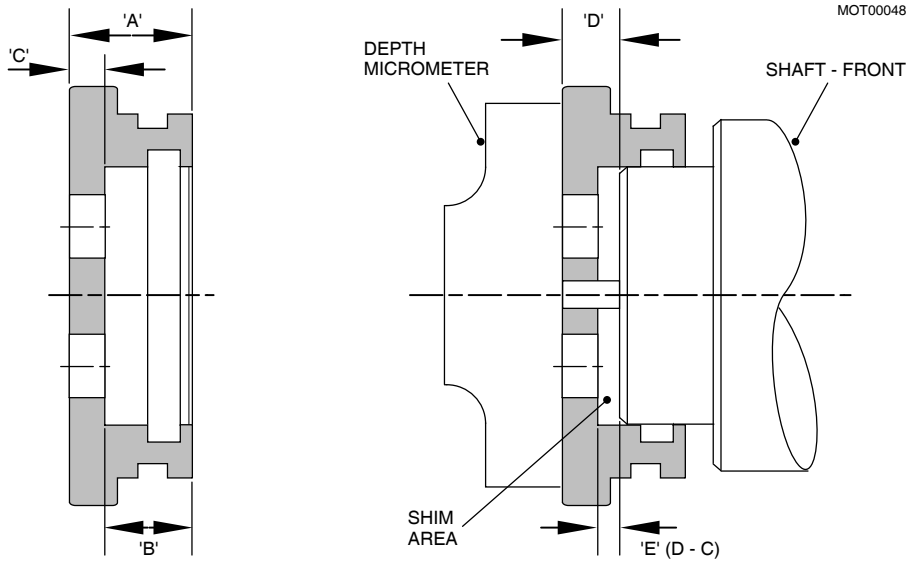


Fig. 3 - Measurements / various

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 Front yoke (17) 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 Front Thrust collar (50) record Measurements as stated:

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

ii) Using Depth micrometer, measure inner bore depth 'B' of Front thrust collar (50) and record value.

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

20. Fit Front thrust collar (50) without 'O'-rings onto Drive shaft (14) and tighten Rear bolts (19) to a nominal torque of 15Nm/11lbf 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 front thrust collar (50) 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 Front Thrust collar (50) 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 Front bolts (19) and Front thrust collar (50) from pivot body end and chap drive shaft (14) to free bearing.

25. Calculate the nominal combination of minimum number if shims (64-69) to achieve the size nearest to dimension 'F'. Record the appropriate part numbers and total nominal thickness value.

26. Select the shims (64-69) and measure the total actual thickness of the combination. Record this value.

27. Place the shim pack (64-69) in the front thrust collar (50) , lock off the front yoke (17) from rotation by suitable method / bar on ground. Torque bolts (19) to full torque.

28. Remove the clamp and spin the front yoke (17) to ensure driveshaft (14) free rotation.

29. Take a magnetic clock gauge located on the flange