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AUSTRALIAN ARMY

# TECHNICAL MANUAL

## USER HANDBOOK

**TRUCK CARGO HEAVY  
WITH CRANE MC3**

2320-66-104-2877

(LIABILITY CODE No 76025)

Specification Army (Aust) 6330

Headquarters Logistic Command

1983

A handwritten signature in black ink, appearing to read "J.C. Hughes".

Issued by Command of the Chief  
of the General Staff

(J.C. Hughes)  
Major General  
General Officer Commanding  
Logistic Command

# AMENDMENT RECORD

Amendment No.	Actioned by: Signature and Date

## SYNOPSIS

The Truck Cargo, Heavy with Crane MC3 is a 6 x 6 wheeled Army version of the MACK R Series commercial chassis. The Army cab and chassis is designated RM6866RS. The truck carries an eight tonne load cross-country and ten tonnes on highways. The primary role of the vehicle is the movement of stores and personnel on sealed, second class roads and under most cross-country conditions.

The vehicle has a range of approximately 500 km on first class roads. When loaded, it is rated to tow gross trailer masses of ten tonnes (cross-country) and seventeen tonnes (highway).

For normal operations the regulatory weight, speeds and dimensions should never be exceeded without the approval of local authorities.

For emergency operations overloading can be accepted as follows:

- a. Gross vehicle mass — 26.0 tonnes.
- b. Gross combination mass — 52.0 tonnes (cross-country).
- c. Gross combination mass — 52.0 tonnes (highway).

# WARNINGS

	<b>Page No.</b>
<p style="text-align: center;"><b>WARNING</b></p> <p>Vehicle now has NO Brakes, and should be recovered to a safeworking area.</p>	<b>58</b>
<p style="text-align: center;"><b>WARNING</b></p> <p>As with any lifting machine a vehicle mounted crane is dangerous if operated incorrectly, therefore it is essential that the operator exercises extreme caution to avoid mistakes which may result in personal injury or property damage. The crane should be operated by trained personnel.</p>	<b>62</b>
<p style="text-align: center;"><b>WARNING</b></p> <p>The correct control handle must be selected so as not to cause a possible mishap.</p>	<b>66</b>
<p style="text-align: center;"><b>WARNING</b></p> <p>Care must be taken when operating the control handles for the purpose of stabilization, to avoid any dangerous movement of the jibs.</p>	<b>66</b>

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# ASSOCIATED PUBLICATIONS

1. Standing Orders for Vehicle Operation and Servicing
2. Australian Army Books:  
Record Book for Service  
Equipment AAB 140 (TGM 120)
3. Complete Equipment Schedules:  
(a) No. CCES 19236  
(b) No. SCES 11653  
(c) No. SCES (AMK) 11654 } Truck Cargo: Heavy  
with Crane MC3
4. Illustrated Repair Parts Identification Listing (R.P.I.L.)
5. Provisional Block Scale 2406/29
6. EMEI VEH A029 — SERVICING OF B VEHICLES
7. EMEI VEH A119-21 — REPAIR OF VEHICLES UNDER  
WARRANTY AGREEMENT
8. EMEI VEH G 710 — DATA SUMMARY
9. EMEI VEH G 713 — UNIT REPAIR
10. EMEI VEH G 714 — FIELD REPAIR
11. EMEI VEH G 714-1 — BASE REPAIR
12. EMEI VEH G 709 — SERVICING
13. EMEI VEH G 719 — SERVICING (Crane)
14. Australian Change In War Material 30351
15. Repair Parts Scale 02162



# FRONTISPIECE

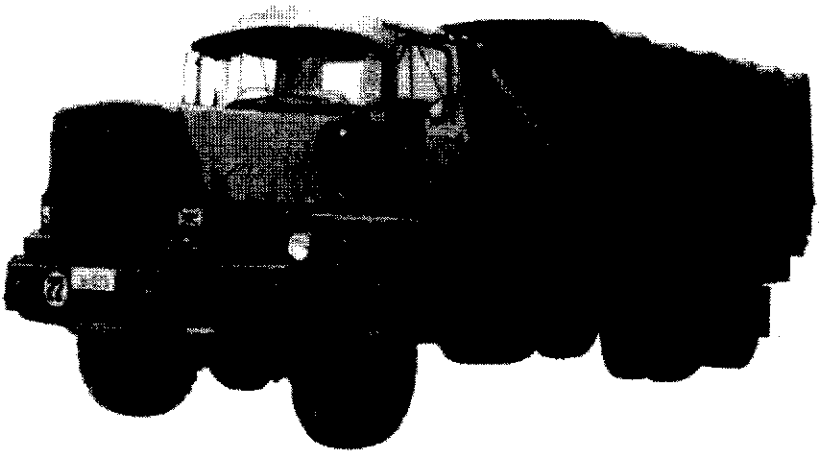


Fig. 1 Truck Cargo: Heavy with crane MC3  
 $\frac{3}{4}$  front with canopy

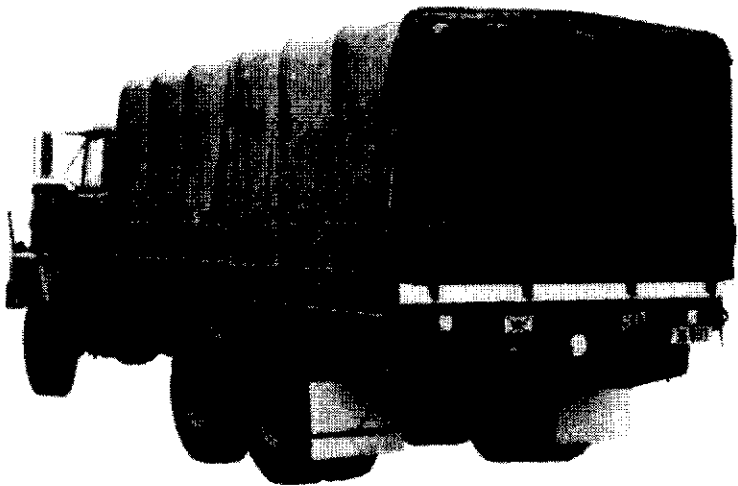


Fig. 2 Truck Cargo: Heavy with crane MC3  
 $\frac{3}{4}$  rear with canopy

# MAJOR UNIT ASSEMBLIES (MUA) IDENTIFICATION

Chassis No. — Right hand rear frame, above  
intermediate axle.

Chassis nameplate — Left hand door inside  
cab

Engine No. — Right hand top of timing  
gear housing

Front axle No. — Left rear of axle housing

Transmission No. — Left hand side

Transfer Case — Right hand rear

Intermediate axle No. — Right hand front  
of carrier housing

Rear axle No. — Right hand front of  
carrier housing

Injection pump identification — Side of the  
pump

Crane — Located on main upright post

Table 1 — Location of vehicle major assemblies  
(MUA) identification

**CHAPTER ONE — GENERAL DESCRIPTION**

**SECTION ONE — DATA SUMMARY**

**SECTION TWO — SHIPPING AND  
TRANSPORTATION  
DATA**

**SECTION THREE — EQUIPMENT  
DESCRIPTION**

# CHAPTER ONE

## GENERAL DESCRIPTION

### NOTE

Throughout this manual all references to left hand (LH) and right hand (RH) are as viewed from the rear of the vehicle looking forward.

## SECTION 1 DATA SUMMARY

**Truck Model No.** MACK RM6866RS

### 1. Engine

Manufacture type	MACK EM6-285 Maxidyne series intercooled, six cylinder in line, four cycle turbo charged, compression ignition.
Displacement	11 litres
Bore	123.8 mm
Stroke	152.4 mm
Compression ratio	15.0:1
Firing order	1—5—3—6—2—4
Power 1200 rpm	184 kW
1800 rpm	212 kW
2100 rpm	211 kW
Maximum torque	1464 Nm at 1200 rpm
Engine operating range	1200 rpm to 2100 rpm

No load maximum	2280 rpm
Engine idle speed	525 rpm to 575 rpm
Oil capacity (Including filters)	55.3 litres
Oil filters	Full pressure, wet sump extended service interval (ESI) plus system, triple, disposable, full flow, spin-on, filters
Pressure	Normal (Hot) at idle (600 rpm) 175 kPa Governed speed (Hot) 275 to 660 kPa
Oil cooler	Shell type with removable tube bundle
Engine weight, dry	982.2 kg includes clutch (excludes alternator and starter motor)

## 2. Cooling system

Type	Centrifugal, engine belt driven water pump and fan
Capacity	54 litre
Thermostat	81 to 83° C opening
Radiator	6450 cm <sup>2</sup> with heavy duty core
Engine coolant operating range	80° to 85° C
Coolant conditioner	Spin on, disposable type

## 3. Engine accessory drive

Type	Twin "V" belts
Tension	Approx. 12mm deflection midway along the longest span using moderate thumb pressure

#### 4. Fuel system

Fuel pump	American Bosch, APE 6-BB injection pump, multiple plunger with hand primer facility, flange mounted, and puff limiter
Injectors	Five hole, spray type nozzle
Fuel filters	Primary and secondary, spin on, disposable type, non-interchangeable

#### 5. Engine starter

Manufacturer, type	Ingersol-Rand air starter with silencer fitted with five bladed vane motor with gear reduction and Bendix drive.
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#### 6. Turbocharger

Manufacturer, type	AiResearch — Garrett, exhaust gas driven, radial flow, pressurised engine oil lubrication
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#### 7. Intercooler

Manufacturer, type	Mack, two stage, or series, water-to-air heat exchanger combined with an air-to-air heat exchanger which is cooled by air from a charge air driven tip turbine fan.
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#### 8. Clutch

Manufacturer, type	Spicer angle-spring, type AS1552 (CL79), two-plate dry
Diameter	393.7 mm
Driven plate facing	Ceramic metallic trapezoidal rigid buttons
Spline diameter	50.8 mm
Actuation	Mechanical, by cable
Free travel (pedal)	38 mm

## 9. Main transmission

Manufacturer, type Mack TRL 1078, five forward gears, one reverse, non-synchromesh, with power take-off (PTO) provision

Ratios	1st gear	8.59:1
	2nd gear	4.99:1
	3rd gear	2.84:1
	4th gear	1.66:1
	5th gear	1.00:1
	Reverse gear	8.81:1

## 10. Power take-off (PTO)

Manufacturer, type Powauto AH 23BR11 hydraulic single speed  
Mounted on the right hand side of the transmission by six studs  
Engagement is operated by an air shift control mounted on the dash panel below hand throttle

## 11. Transfer case

Manufacturer, type Mack TC150 incorporating permanent front wheel drive, torque proportioning differential and differential lock out which is automatically engaged when low range is selected

Ratios	High	0.768:1
	Low	1.992:1
	Front	0.966:1

## 12. Crane

Manufacturer, type	Abbey CTM 3000-1 Mounted behind spare wheel carrier Hydraulic drive from power take-off mounted on the right hand side of the transmission 360° operating range (See fig. 25 for maximum safe working loads)
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## 13. Front drive axle and Suspension

Manufacturer, type	Fabco SDA-18B rated at 8.18 tonnes
Carrier	Eaton
Ratio	6.5:1
Front springs	2 x 7 leaf, semi elliptical rated at 5.4 tonne plus 10%
Shock absorbers	Telescopic, hydraulic

## 14. Rear tandem axle

Manufacturer, type	Mack SS441W bogie rated at 20 tonne
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## 15. Carriers

Intermediate	Mack CRDPC921 with double reduction and inter-axle power divider and inter-wheel power divider
Rear	Mack CRD931 with double reduction and inter-wheel power divider
Ratio	6.34:1



<b>16. Chassis</b>	Single rail, heat treated
<b>Wheelbase</b>	5465 mm
<b>Front axle to Intermediate axle</b>	4765 mm
<b>Bogie axle spacing</b>	1400 mm

**17. Steering**

<b>Manufacturer, type</b>	Sheppard, model 592 integrated power assist steering (MACK SGP49)
<b>Steering gear ratio</b>	20:1
<b>Steering wheel diameter</b>	56 cm
<b>Turning circles</b>	
Between kerbs	Average 24.1m
Between walls	Average 25.1m

## 18. Wheels and tyres

Rim, type and size	8.00 x 20, 3 piece, 10 stud disc
Tyre size and type	12.00 x 20 x 18 ply rating radial
Tyre pressure (cold)	Highway: front 625 kPa intermediate 575 kPa rear 575 kPa Sand: front 525 kPa intermediate 375 kPa rear 375 kPa Cross-country: front 625 kPa intermediate 575 kPa rear 575 kPa
Wheel stud size and thread	Front — 1 1/8 ins. — 16 threads per inch, UNF (Unified National Fine thread) Rear Outer — 1 1/8 ins. — 16 threads per inch (UNF) Inner — 3/4 in. (UNF)
Provision for tyre inflation	Air take off, and hose located left hand side adjacent to step

## 19. Brakes — vehicle

Type	Two line, air operated, wedge actuated, twin shoe drum brakes self adjusting
Actuation	Foot pedal
Parking brake	Spring brakes on rear axles
Maximum gradient for parking brake holding (Highway laden)	20 per cent uphill or downhill

## **20. Brakes — trailer**

<b>Type</b>	Two line, air operated
<b>Actuation</b>	Foot pedal or hand control valve
<b>Couplings</b>	Gladhand couplings fitted at the rear of vehicle

## **21. Driveshafts and universals**

<b>Manufacturer</b>	Spicer
<b>Main transmission to transfer case</b>	1810 H.D. Series with two universal joints
<b>Transfer case to front axle</b>	1610 series, two piece with three universal joints and centre support bearing
<b>Transfer case to intermediate axle</b>	1810 H.D. series with two universal joints
<b>Intermediate to rear axle (rear)</b>	1810 H.D. series, one piece with two universal joints

## **22. Air compressor**

<b>Manufacturer, type</b>	Bendix-Westinghouse reciprocating TU-FLO 501
<b>Capacity, rating</b>	0.34 m <sup>3</sup> minute at 1250 rpm governed to 830 kPa. Air supplied from engine intake manifold
<b>Lubrication</b>	Engine oil pressure
<b>Drive</b>	Engine driven shaft

### **23. Electrical system**

<b>System voltage</b>	<b>24V negative earth</b>
<b>Batteries</b>	<b>Two, 12V 61 Ampere-hour</b>
<b>Location</b>	<b>Battery compartment, right hand side forward of air tank</b>
<b>Alternator</b>	
<b>Make</b>	<b>EDE</b>
<b>Manufacturer</b>	<b>Ordance Factory Maribyrnong, Victoria Australia</b>
<b>Drive</b>	<b>Indirect, twin 'V' belts</b>
<b>Voltage</b>	<b>28V</b>
<b>Maximum output cold</b>	<b>140 amps</b>
<b>Maximum output hot</b>	<b>100 amps</b>

### **24. Lighting, External**      **Location, Quantity and Wattage**

<b>Headlights, high/low/park</b>	<b>Front of vehicle, 2 off, 75/70 watt, Quartz Halogen, 2 off, 2 watt</b>
<b>Stop and tail lights</b>	<b>Rear of vehicle, 2 off, 21/5 watt</b>
<b>Directional signal indicator lights</b>	<b>Each corner of vehicle, 4 off, 18 watt</b>
<b>Clearance lights</b>	<b>Each side of vehicle — mirrors, 2 off, 2 watt</b>
<b>Body side lights</b>	<b>Side of cargo body, 12 off, 3 watt</b>
<b>Side marker lights</b>	<b>Front mudguards 2 off, 5 watt</b>
<b>Back-up lights</b>	<b>Rear of vehicle, 2 off, 18 watt</b>

<b>25. Lighting, Internal</b>	<b>Location, Quantity and Wattage</b>
Dome light	Rear roof of cabin, 1 off, 5 watt
Map reading light	Left hand side of instrument panel, 1 off, 5 watt
Panel gauges and warning lights	Instrument panel, 12 off, 2 watt
Fibre optic light	Instrument panel, 1 off, 3 watt
Directional signal light	Directional indicator switch, 1 off, 2 watt
<b>26. Military Lighting</b>	
Blackout lights	Front and rear of vehicle, 6 off, 5 watt
Convoy light	Rear of vehicle, 1 off, 5 watt
Reduced headlight	Right hand front of vehicle, 1 off, 18 watt
Gauges	Instrument panel, 5 off, 3 watt
Pyro. gauge light	Instrument panel, 1 off, 2 watt
<b>27. Circuit breakers</b>	<b>Capacity</b>
Located inside the cab, left hand side, behind protecting panel	
1. Blackout	10 amp
2. Reduced Headlamp	10 amp
3. Constant power, horn, windscreen washer, map light	10 amp
4. Stop lights and reversing lights	15 amp
5. Headlights	20 amp
6. Side marker	10 amp
7. Turn indicators, interior lights, Hi/Lo buzzer and light	15 amp

8. Constant key power and voltmeter	15 amp
9. Dynatard engine brake	20 amp
10. Heater & demister	20 amp
11. Spare key power	15 amp

## 28. Performance

Gradeability (both directions) cross country laden	50 per cent gradient (22.5 degree slope)
Range of operation	550 to 590 km (first class roads) approx. 400 to 450 km (second class roads) approx.
Fuel consumption	40 litres per 100 km (Highway laden) 43 litres per 100 km (Cross-country laden). Fuel tank capacity 265 litres

## 29. Troop carrying capacity

Fully kitted	22
Un-kitted	28

## 30. Tray body load area

Width (with seats)	2298 mm
(without seats)	2390 mm
Length	5016 mm

# CHAPTER ONE

## GENERAL DESCRIPTION

### SECTION 2 SHIPPING AND TRANSPORTATION DATA

#### 31. Dimension

Overall length	9600 mm
Wheelbase	5465 mm
Front axle to intermediate axle	4765 mm
Bogie axle spacing	1400 mm
Overall width	2500 mm
Overall height — Laden	3125 mm
— Unladen	3155 mm
Track — front	1911 mm
— intermediate	1810 mm
— rear	1810 mm

#### Cargo tray

Length	5016 mm
Width	2500 mm
Height of cargo sides (from cargo tray)	350 mm
Height of canopy from floor (from cargo tray)	1635 mm
Height of cargo tray from ground	
— Laden	1448 mm
— Unladen	1486 mm

Rear axle to rear of vehicle/overhang	1880 mm
Towing pintle height — Laden	892 mm
— Unladen	930 mm
Mass (Unladen)	
— Front axle	5764 kg
— Rear axle	7046 kg
— Total	12810 kg

### 32. Capacities

Equipment	DEF(AUST) 206	METRIC (litres)
Engine system (including filters)	OMD-115	55.3
Cooling system (including conditioner)		54
Main transmission	OEP-220 (1)	10.4
Transfer case	OEP-220 (1)	9.5
Front axle	OEP-220 (1)	11.4
Rear axle		
— intermediate	OEP-220 (1)	12.0
— rear	OEP-220 (1)	11.2
Power steering	OMD-115	7.75
Crane reservoir	OM-65	75
Fuel tank	Diesel fuel- distillate	265

(1) See EMEI VEH G709 for list of approved lubricants

### 33. Forging depth

Unprepared vehicle	800 mm
Limiting features	Fan — 1354 mm
Prepared vehicle	No facility available, as for unprepared vehicle

### 34. Bridge classification

Solo laden (Highway)	22
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### **35. Ground clearance**

Unladen	318 mm
Limiting feature	Rear spring caps
Laden	280 mm
Limiting feature	Rear spring caps

### **36. Transportability**

Railway loading gauges (Local authorities must be consulted)

Victoria	1600 millimetres
Commonwealth	1435 millimetres
New South Wales	1435 millimetres
South Australia	1435 millimetres
Western Australia	1435 millimetres
Commonwealth	1067 millimetres
Queensland	1067 millimetres
South Australia	1067 millimetres
Tasmania	1067 millimetres
Western Australia	1067 millimetres

### **37. Approach and departure angles**

Laden approach angle	31.5 degrees
Unladen approach angle	32.5 degrees
Limiting feature	Muffler and brackets
Laden departure angle	30.5 degrees

Unladen departure angle

31.5 degrees

Limiting feature

Tow hook

### 38. Transport

#### Slinging and tie-down points

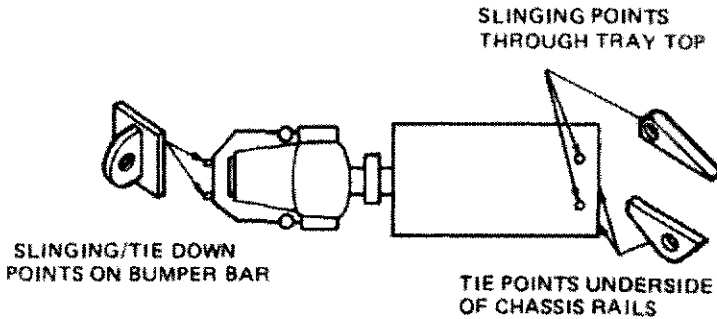


Fig. 3 Slinging and tie-down points

#### Sea Transportability

Ship Type	Transportable	Numbers	Method of loading/discharge
Landing Craft Medium LMCS	YES	1	RO-RO
Naval lighterage equip.	YES	4 unladen / 3 laden	as above
Landing Craft Heavy LCH	YES	6	as above
Landing Ship Heavy LSH	YES	approx. 40	as above
HMAS JERVIS BAY	YES	approx. 42	as above
Commercial ships	YES	In the unladen condition, the vehicle is transportable in the RO-RO or LO-LO Condition RO-RO = Roll on — Roll off LO-LO = Crane load/unload	

Airportability

The truck, cargo, heavy, with crane MC3 is not airportable

Shipping Volume  
Mass (Unladen)

At reducible width and height 70.7 m<sup>3</sup>  
12810 kg

# CHAPTER ONE

## GENERAL DESCRIPTION

### SECTION 3

### EQUIPMENT DESCRIPTION

#### Introduction

39. The truck, cargo heavy with crane MC3 is a derivative of the truck cargo, heavy MC3. The vehicle incorporates a main transmission and transfer case with gearing designed to enable the vehicle to negotiate any terrain or gradient that will allow wheel traction, in practice this is limited to 50 per cent on concrete (approximately). The vehicle also incorporates a hydraulic crane to facilitate self loading/unloading and the transfer of loads between vehicles.

#### Operational and logistic concepts

40. The truck cargo heavy with crane provides the main means of logistic wheeled support for second line transport and contributes significantly to the third line transport support of field forces. The cargo crane vehicle is designed to transport palletised stores and is also fitted with a removable canopy and demountable seating for the transport of troops.

#### Engine

41. The cargo crane vehicle is fitted with a Mack "Maxidyne" EM6-285 six cylinder diesel engine. The engine is of the constant horsepower principle and incorporates a turbocharge with a "series intercooler" to increase volumetric efficiency. The engine produces 212 kW at 1800 rpm and 1464 Nm torque at 1200 rpm.

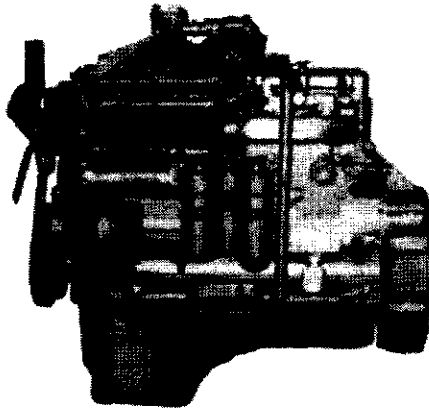


Fig. 4 Mack 'Maxidyne' EM6-285 engine

## **Main transmission**

42. The transmission is a wide ratio, constant mesh, non synchro 5-speed transmission which is designed to match the engine operating range from 1200 to 2100 rpm thereby ensuring minimum gear changes. Clutch and gear operations are manual, without power assistance. A clutch brake is provided which operates during the last 25 mm of clutch pedal travel, to slow the transmission to assist in the selection of low gears, from a standstill.

## **Power Take Off (PTO)**

43. The PTO is a Powauto AH 23BR11 hydraulic single speed model, mounted on the right hand side of the transmission. The hydraulic pump is mounted behind the mechanical PTO and is connected to the crane via a hydraulic line. To engage the PTO the dash mounted switch is moved to the "ON" position. In this position the PTO engagement light will light up.

## **Clutch**

44. The vehicle is fitted with a Spicer model AS1552 (CL79) angle spring two plate clutch. The angle spring clutch uses six angle springs and is of the dry disc internally adjustable, pull-type design. The centrally located pressure springs are entirely insulated from the heat of the pressure plate. The pressure plate is driven by drive lugs which mate with drive slots in the clutch flywheel ring. Adjustments for lining wear **MUST** be made internally on the threaded adjusting ring. If clutch adjustments are attempted on the external adjusting lever early clutch failure will result.

## **Transfer case**

45. The vehicle is fitted with a two speed, manual change transfer case which incorporates an unequal torque proportioning gear type power divider to drive the front and rear axles. The power divider is automatic in operation but should it be necessary, it may be eliminated by the use of an air operated power divider lock out (PDLO) operated from the instrument panel. The PDLO also operates the inter-axle power divider fitted to the intermediate axle by a paralleling air circuit. When selecting low range the PDLO is automatically engaged.

## **Rear tandem axles (bogie)**

46. The bogie comprises an intermediate and rear axle assembly. Each assembly consists of a double reduction gear type differential (carrier) incorporating a power divider (cam and plunger differential) which exerts bias toward the axle offering the most resistance, a primary feature is that it prevents cross shaft "wind-up". An additional inter-axle power divider is carried in front of the intermediate axle to prevent "wind-up" between the intermediate and rear axle assemblies. Drive between the intermediate and rear axle is by a short

propellor shaft fitted with universal joints. Drive to the bogie wheels is achieved through "full floating" axles fitted with air/spring operated wedge actuated, twin shoe drum brakes.

### **Power dividers**

47. The power dividers are automatic in operation and designed such that should either the front or rear bogie axle lose traction on one wheel 75 per cent traction is directed to the bogie axle which still has traction. The power divider lock-out facility (PDLO) is operated by a switch on the instrument panel and should be actuated only when extremely slippery off road conditions are encountered. When low range is selected the PDLO is automatically engaged.

### **Front drive steer axle**

48. The vehicle is fitted with a front drive steer axle, comprising a differential carrier assembly and axles, driving through universal joints to steerable drive ends fitted with air operated, wedge actuated, twin shoe drum brakes.

### **Power steering**

49. The vehicle is fitted with integrated power assist steering, wherein the booster cylinder, control valve and mechanical steering are incorporated into a single unit. Other major components of the steering include a reservoir, engine driven pump and hydraulic piping. It should be noted that should the power assistance fail, the mechanical section will function as a normal, non power assisted steering gear, but with a considerable increase in steering effort required.

### **Front suspension**

50. The front suspension consists of semi-elliptic leaf springing dampened by telescopic shock absorbers. Bump stops are provided to limit vertical suspension travel.

### **Rear suspension**

51. The rear suspension is of the parallelogram type with below axle mounting, "camel-back" leaf springing is employed.

### **Crane**

52. The Abbey CTM 3000-1 model is mounted behind the spare wheel carrier and is hydraulically driven from the PTO. The crane is capable of lifting 750 kg at a maximum distance of 5.3 metres (See fig. 25 for safe working loads), with stabilizer supports to assist the stability of the vehicle. It has a 360° operating range. When folded to the travelling position it has an overall height of 3000 mm above the ground with an unladen vehicle.

## **Service brakes**

53. The vehicle is fitted with a dual circuit air brake system, consisting of two completely separate air circuits and a reserve emergency supply. The primary circuit supplies the rear brakes and the secondary circuit supplies the front brakes, each circuit, although separate, operates as a single system through a dual delivery treadle valve. Check valves protect each circuit in case of air loss in either primary or secondary system.

54. The reserve air supply is used to release the spring brakes when there is a loss of air in both primary and secondary systems, this allows the vehicle to be moved to a safe working area. This circuit is operated by a control on the instrument panel. Automatic adjusting wedge actuated drum brakes are fitted to the vehicle and operate when air pressure acting on a plunger diaphragm forces a wedge head between rollers and plungers attached to the brake shoes, the plungers and rollers then spread apart causing the brake linings to bear against the drum surface.

## **Emergency/parking brake**

55. Spring brakes are used as emergency and parking brakes on both bogie axles.

56. The spring and service brake assembly are an integral unit comprising a diaphragm type service chamber, which applies the service brake when air pressure from a brake application is delivered, and a second chamber containing a strong spring under compression. The spring applies the service brakes when there is a loss of air pressure in both the primary and secondary air systems. The emergency/parking brake can be controlled from the cab by use of a hand operated valve. In order to apply or release the emergency/parking brake, the control valve in the cab is moved by the driver as directed on the knob and decal.

## **Engine brake**

57. The service brakes are assisted by an engine brake device (Dynatard), which converts the engine into an air compressor. This is accomplished by opening the exhaust valve near the completion of the compression stroke.

58. The engine when acting as an air compressor increases friction horsepower or retarding force providing increased vehicle safety from better braking control which also provides extended brake drum and lining life as well as increased tyre life.

59. The Dynatard can be activated by two methods, either by depressing the brake treadle valve or by operating a control switch on the instrument panel. With either method the accelerator pedal must be released to allow the injector pump rack to move to the zero fuel position. This action closes the injector pump switch allowing the electrical current to energise the solenoid control valve to bring the Dynatard into action. However, should the engine reach idle, the

governor will automatically advance the rack from the no-fuel to a fuel delivery position, opening the injector pump and disengaging the Dynatard system.

#### NOTE

Exercise caution when using the engine brake in wet or slippery conditions, especially if the vehicle is in a low gear and unladen.

### **Air starting system**

60. Cranking is performed by a five-vaned air motor with gear reduction which drives the engine flywheel through a conventional Bendix-type drive. A 0.27 cu. metre air starting reservoir provides air at 830 kPa maximum pressure for the engine cranking motor only. The connection to the cranking motor is through a flexible hose with a quick-acting relay valve to permit operation of the motor. This relay valve is operated through the instrument panel mounted ignition switch.

### **Instruments, electrical accessories and controls (See Fig. 7)**

#### **61. Coolant temperature gauge (Fig. 7 item 1)**

The proper operating temperature of the engine coolant is between 80 and 85°C. Extremely high ambients, slow operating conditions with heavy loads or steep grades at high altitudes affects temperatures. As long as loss of coolant does not occur, higher than normal operating temperatures are not harmful.

#### **62. Directional signal switch (Fig. 7 item 2)**

Push lever forward for right turn signals, and pull rearwards for left turn signals. Return to mid position manually after turn is made. There is also an audible sound from a dash mounted indicator, mounted between tachourmeter and speedometer.

#### **63. Engine warning light (Fig. 7 item 3)**

When coolant level in radiator drops below required level, when oil pressure drops to 70 kPa or when coolant temperature exceeds 93°C an engine warning light will illuminate on the instrument panel and a bell will sound. Stop engine and determine cause.

#### **64. Oil pressure gauge (Fig. 7 item 4)**

Under normal operating conditions, the engine oil pressure will be between 275 kPa and 660 kPa, depending on engine speed and oil viscosity. Oil pressure may drop below 275 kPa at engine idling speed. Should pressure at operating speeds drop suddenly from normal reading, stop engine immediately and determine cause.

**65. Tachourmeter (Fig. 7 item 5)**

Engine speed is indicated in revolutions per minute. The tachometer readings should be used as a guide for shifting and selecting the various transmission speeds. The number of hours running is also recorded.

**66. Electric horn button (Fig. 7 item 6)**

Depression of the centre button of the steering column operates the horn.

**67. Air horn (Fig. 7 item 7)**

Operated by a push button on the right hand side of the dash panel.

**68. Emergency/parking brake warning light (Fig. 7 item 8)**

The vehicle must not be moved when this light is on as the emergency/parking brakes are applied.

**69. Speedometer and odometer (Fig. 7 item 9)**

Indicates road speed in kilometres per hour and total distance vehicle has travelled. High beam indicator is shown by light symbol.

**70. Trailer brake lever (Fig. 7 item 10)**

Pull trailer brake lever back to apply brakes. Push away to release.

**71. Reversing lights**

Lights automatically when shift lever is moved to the reverse gear position. Do NOT leave gear lever in reverse when parking.

**72. Clearance lights switch (Fig. 7 item 11)**

This switch controls the clearance lights on the vehicle mirrors.

**73. Instrument lights (Panel) (Fig. 7 item 12)**

Turn knob right to "ON" position and keep turning until desired intensity is obtained. Ensure the instrument lights are turned off during day time operation as they are controlled independantly of the headlights.

**74. Headlights/Park lights (Fig. 7 item 13)**

Switch down for park lights (including body side lights) and up for headlights.

**75. Map reading lamp (Fig. 7 item 14)**

Located left hand side of the dash panel.

**76. Power divider lock out (Fig. 7 item 15)**

Supplies increased traction when necessary. Switch to the left, PDLO activated. Switch to the right, normal driving position PDLO disconnected. When PDLO is activated, a warning buzzer will sound



and a light will illuminate on the instrument panel. Switch is located on the top of the dash.

**77. Air pressure gauge (Fig. 7 item 16)**

The operating air pressure is between 655 kPa and 830 kPa. If the pressure should drop below 480 kPa the low pressure warning buzzer will operate as well as a warning light on the dash, indicating an unsafe vehicle. Cause of the failure should be determined before proceeding. Vehicle should not be moved until air pressure has reached at least 480 kPa and the buzzer and light have been switched off. This gauge has readings of primary and secondary air supplies. The primary system has a green indicator needle and the secondary a red indicator needle. Engine starting air pressure is not indicated.

**78. Fuel gauge (Fig. 7 item 17)**

This gauge registers fuel level in the supply tank.

**NOTE:**

On early models the fuel gauge will read a maximum of approximately  $\frac{3}{4}$  to  $\frac{7}{8}$  when full. However, the gauge is accurate below  $\frac{3}{4}$ .

**79. Normal, blackout and reduced lighting switch (Fig. 7 item 18)**

The three position headlights, blackout and reduced lighting switch provides the following functions:

- (a) Normal Lighting allows the use of head, tail, stop, parking, clearance, number plate, direction turn indicator, instrument, map reading and cab courtesy lights.
- (b) Reduced Lighting allows the use of only the reduced headlight, blackout marker, blackout stop, convoy, instrument lights and the map reading light. Provision for dimming and switching off the instrument lights is provided.
- (c) Blackout Lighting allows only the use of blackout marker, blackout stop, convoy, instrument and map reading lights.

**80. Dynatard engine brake switch (Fig. 7 item 19)**

Switch to "OFF" position when not in use. When in "OFF" position, light application of the brake pedal will operate the dynatard brake. When in "ON" position, as the foot lifts off the throttle the dynatard is automatically engaged.

**81. Voltmeter (Fig. 7 item 20)**

- (a) The voltmeter is graduated from 18 volts to 32 volts.
- (b) With the starting switch 'on' or 'off', the voltmeter will show the condition of the batteries. This reading should be approximately 24 volts.

- (c) With the engine running at operating speeds, the voltmeter will show the condition of the charging system. This reading should be between 24 volts and 28 volts.
- (d) Any prolonged reading below or above these figures indicates the batteries or charging system requires a complete check.

**82. Hazard switch (Fig. 7 item 2)**

The hazard switch is incorporated into the directional indicator switch. Pull lever out to actuate four-way flasher. To deactivate the hazard warning lights move the lever forward or rearward and return to central position.

**83. Hand throttle (Fig. 7 item 21)**

Press button and pull knob out for quick response. Minor adjustment may be carried out by turning knob. For cancellation, press button and fully return knob.

**84. High-low beam dipper switch (Fig. 5 item 5)**

Press down to switch from high to low or from low to high beam.

**85. Clutch pedal (Fig. 5 item 6)**

Depress pedal to disengage clutch, last 25 mm of pedal travel operates the clutch brake.

**86. Brake pedal (Fig. 5 item 4)**

Depress pedal progressively to apply increased braking pressure. Brake pedal is interconnected to Dynatard.

**87. Accelerator pedal (Fig. 5 item 3)**

Air operated, controls engine speed. Depress to increase speed as required.

**88. Electrical system ignition/start switch (Fig. 7 item 22)**

When switch is straight up and down, switch is off. Turn clockwise to activate vehicle electrical system and further movement to operate air starter.

**89. Engine stop control (Fig. 7 item 23)**

Pull out to stop engine. Leave in "out" position whenever engine is not running. Return to "in" position prior to starting. To release, turn clockwise to disengage ratchet and push "in".

**NOTE**

On some early models the stop control is not fitted with a ratchet.

**90. Steering column adjuster (Fig. 5 item 1)**

This allows steering column to be moved fore and aft approximately 76 mm. Press down to release, up to lock.

**91. Air operated windscreen wipers (Fig. 7 item 24)**

Pull out to operate. Turn knob for speed control. To cancel, push in and hold in until wipers have parked, then release.

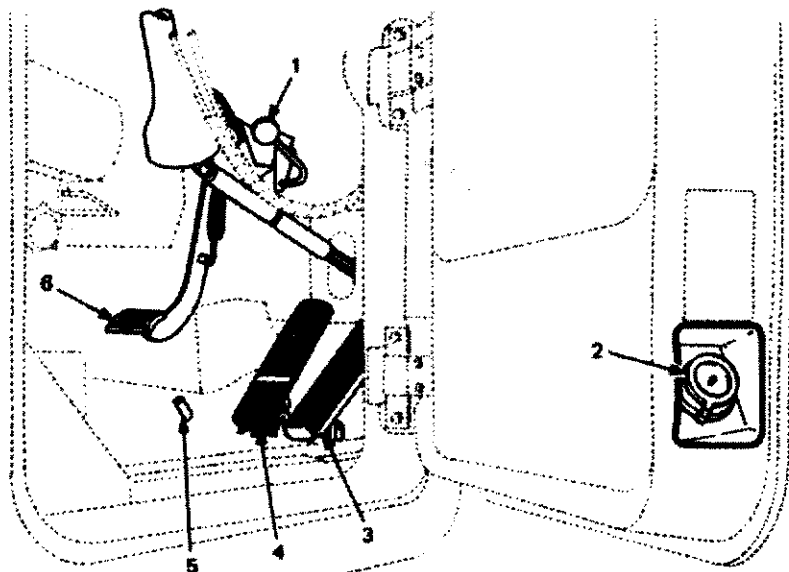
- 92. Electric windscreen washers (Fig. 7 item 25)**  
Push button in and hold as long as water is required. The windscreen washers are incorporated in the blade, while the water supply is in the driver's door (see fig. 5 item 2).
- 93. Tractor protection valve (Fig. 7 item 26)**  
Push to release. Pull to apply. **DO NOT USE FOR PARKING.**
- 94. Main transmission shift lever (Fig. 7 item 27)**  
Manually changes gear ratios in the main transmission.
- 95. Main transmission shift diagram plate (Fig. 11)**  
Illustrates main transmission shift pattern.
- 96. Transfer case shift lever (Fig. 15 item 1)**  
Manually changes gear ratios in the transfer case.
- 97. Transfer case shift pattern (Fig. 12)**  
Illustrates transfer case shift pattern and operating instructions.
- 98. Engine operating instruction plates (Fig. 7 item 28)**  
Observe correct operating procedure. See fig. 13.
- 99. Parking brake (emergency stop) (Fig. 7 item 29)**  
Push lever down, hold down and push lock slide to the right. To release, push lever down slightly, push lock slide to the left, then release lever to "OFF" position.
- 100. Exhaust pyrometer (Fig. 7 item 30)**  
Indicates temperature of exhaust gases at the exhaust manifold, aiding the operator to avoid excessive exhaust temperature by correct selection of gear ratio for load and grade conditions. Maximum operating temperature is shown on the pyrometer facia nameplate.  
An indication of readings are:-  
350° to 450° C Light load.  
450° to 550° C Heavy load.  
550° to 650° C Overload.
- 101. Reserve air supply (Fig. 7 item 31)**  
Pull out for normal operation and push in for reserve air supply. This only supplies air for the emergency release of the spring brakes.
- 102. Crane operating instruction plate (Fig. 7 item 32)**  
Observe correct operating instructions (Fig. 23). **DO NOT** stand under load.
- 103. Crane PTO operating lever (Fig. 7 item 33)**  
To be engaged when operating crane (Fig. 23).
- 104. PTO engagement light (Fig. 7 item 34)**  
This will light up when PTO is engaged (Fig. 23).
- 105. Servicing data and tyre pressure plate (Fig. 9)**  
Observe correct servicing data and tyre pressures. This plate is located on the inside lower section of the left hand door.

**106. Nomenclature plate (Fig. 10)**

This plate is located on the inside lower section of the left hand door.

**107. Heater controls**

For operation of heater see following section.

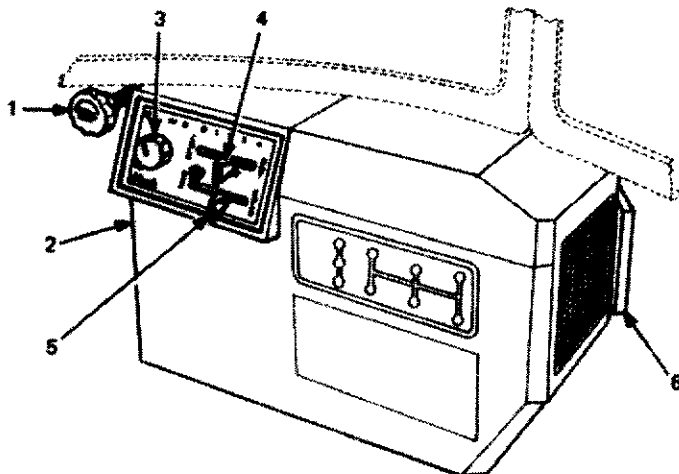


- |                                      |                         |
|--------------------------------------|-------------------------|
| 1. Steering wheel adjustment control | 4. Brake pedal          |
| 2. Windscreen washer reservoir       | 5. High/Low beam switch |
| 3. Accelerator pedal                 | 6. Clutch pedal         |

**Fig. 5 Controls — forward cabin area**

## Cabin heating and ventilation system

108. This heater is designed with sufficient capacity to supply uniform defrosting for both left and right hand windshields and at the same time maintain comfortable cab temperatures.



- |                               |                                |
|-------------------------------|--------------------------------|
| 1. Top cowl vent              | 4. Temperature control         |
| 2. Left hand heat outlet door | 5. Defroster control           |
| 3. Fan control                | 6. Right hand heat outlet door |

Fig. 6 Cabin heating system layout

### 109. Top cowl vent (Fig. 6 item 1)

Rotating the control clockwise closes the ventilator, anti-clockwise opens it. When open at normal highway speeds, this will provide warm air circulation for heating and defrosting without operating the heater fan motor. Under severe cold conditions, the fan motor may also be used to supplement the ram air. In summer, this ventilator may be used for fresh air ventilation.

### 110. Left hand heat outlet door (Fig. 6 item 2)

When opened will provide warm air to the passenger area.

### 111. Fan control (Fig. 6 item 3)

Turn clockwise from off position to desired fan speed, low, medium or high. Turn anti-clockwise to shut-off.

### 112. Temperature control (Fig. 6 item 4)

Operates the water flow supplying the heater core. Push right to obtain desired temperature. Full right position is high, full left is off. There is a control flow tap mounted on the left rear of the engine. This allows water flow to be turned off during summer.



## KEY

1. Coolant temperature gauge
2. Directional signal/hazard switch
3. Engine warning light
4. Oil pressure gauge
5. Tachourmeter
6. Electric horn button
7. Air horn
8. Emergency/parking brake warning light
9. Speedometer and odometer
10. Trailer brake lever
11. Clearance lights switch
12. Instrument lights (Panel)
13. Headlights/Parking lights
14. Map reading lamp
15. Power divider lock out
16. Air presure gauge and low air pressure warning lamp
17. Fuel gauge
18. Normal, Blackout and reduced lighting switch
19. Dynatard engine brake switch
20. Voltmeter
21. Hand throttle
22. Electrical system ignition/start switch
23. Engine stop control
24. Air operated windscreen wipers
25. Electric windscreen washers
26. Tractor protection valve
27. Main transmission shift lever
28. Engine operating instruction plates
29. Parking brake (emergency stop)
30. Exhaust pyrometer
31. Reserve air supply
32. Crane operating instruction plate
33. PTO operating lever
34. PTO engagement light

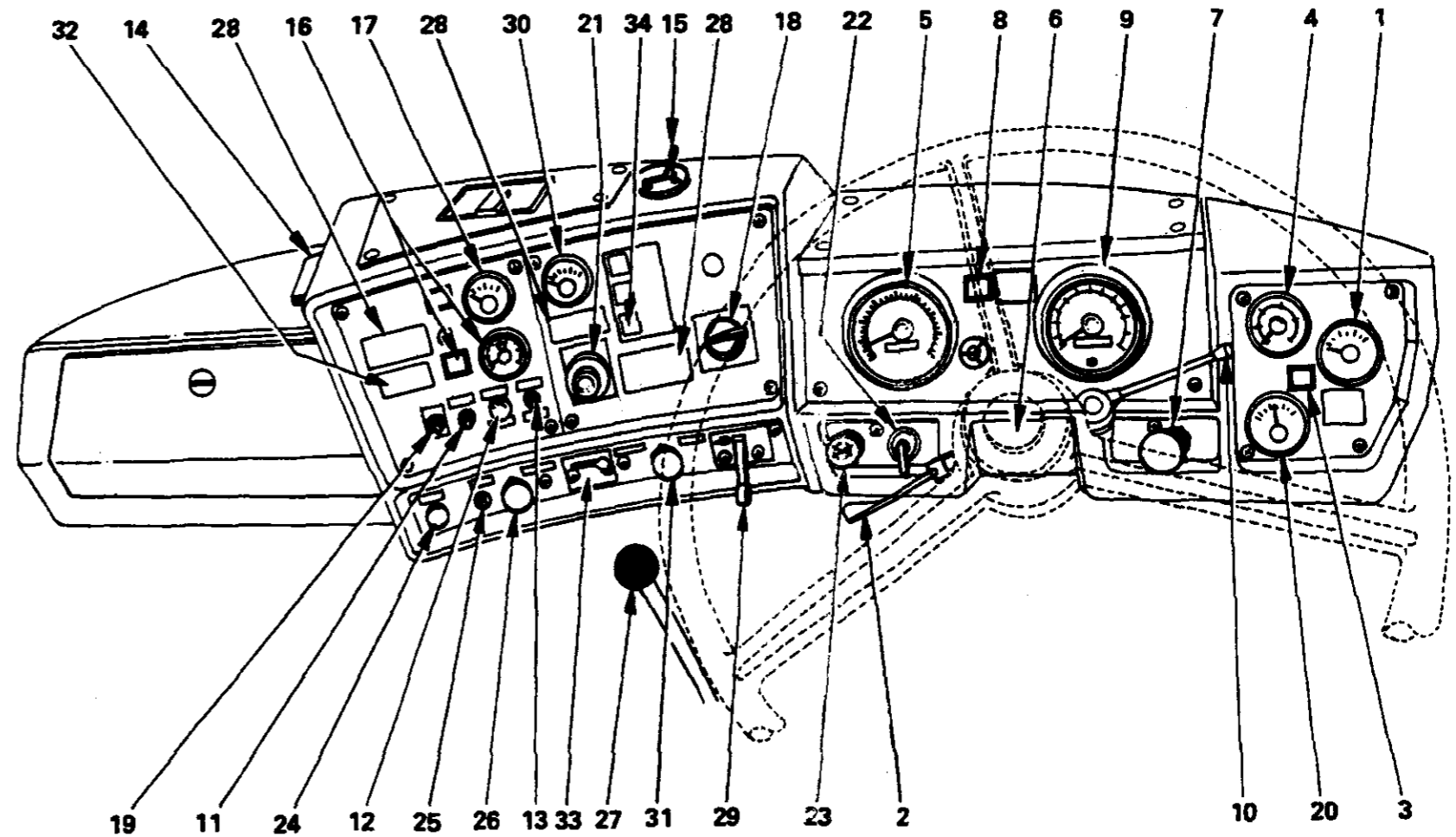


Fig. 7 Instruments, electrical accessories and controls

**113. Defroster control (Fig. 6 item 5)**

Provides entire flow of air to either the defroster or cab interior with any intermediate combination required. Pull left to increase defrosting action. Pull right diverts air flow to cab. Adjust for desired combination.

**114. Right hand heat outlet door (Fig. 6 item 6)**

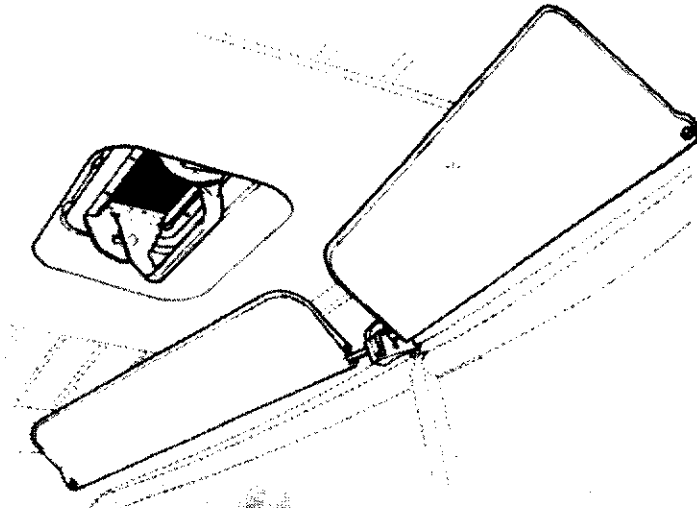
Provides additional warm air to driver.

**NOTE:**

For maximum ram air delivery, top cowl ventilator must be open with roof ventilator control to the rear of the cab. Both heat outlet doors should be closed for maximum ram air defrosting.

**115. Cabin roof ventilation (Fig. 8)**

Cab ventilation is supplemented by means of a roof vent. The roof vent is operated by moving the vent handle forward thus forcing air into the cab while the vehicle is in a forward motion. The roof vent may also be moved rearwards for fresh ram air winter operation (in conjunction with top cowl vent).



**Fig. 8 Cabin roof ventilation**



SERVICING DATA			
TYRE INFLATION PRESSURES k Pa ( LADEN )			
AXLES	HIGHWAY	CROSS COUNTRY	SAND
FRONT	625	625	525
REAR	575	575	375
LUBRICATION			
ENGINE	OMD 115	AXLES	OEP 220
GEARBOX	OEP 220	WINCH	OEP 220
TRANSFER CASE	OEP 220	CRANE	OM 65
POWER STEERING	OMD 115	HOIST	OM 65
ALL GREASE POINTS XG 274			

X 50 RU 316 B

**NOTE:**  
See EMEI VEH G709 for approved lubricants

Fig. 9 Servicing data and tyre pressure plate

NOMENCLATURE:		TRUCK CARGO HEAVY CRANE MC3	
LIABILITY CODE:		76025	
MANUFACTURER: MACK TRUCKS AUSTRALIA PTY. LTD.			
CAPO NUMBER:	V	CHASSIS NO: RM6866 RS	
CHANGE OF TITLE:	Date	kms	
(whichever occurs first)			
		HIGHWAY CROSS COUNTRY	
		kgs	kgs
UNLADEN MASS (GVM LESS PAYLOAD)		12810	12810
ARMY RATED GVM		22810	20810
ARMY RATED GCM		39810	30810
MANUFACTURERS DESIGN GVM		25900	25900
MANUFACTURERS DESIGN GCM		54800	54800

X 50 RU 312 BP3

Fig. 10 Nomenclature plate

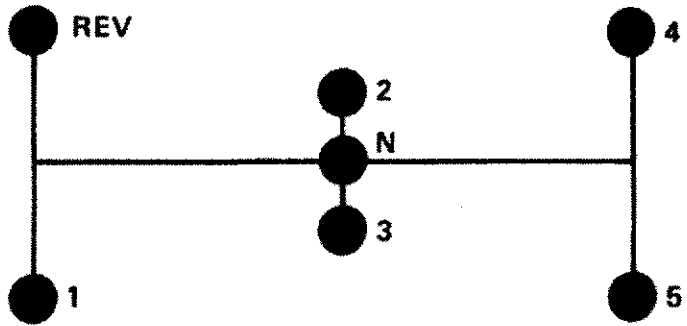
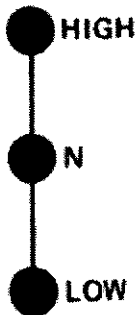


Fig. 11 Main transmission shift pattern

**WARNING**  
Shift only with vehicle stationary.



**WARNING**

**TO AVOID SERIOUS DAMAGE,  
REMOVE AXLES OR PROPELLER  
SHAFTS BEFORE TOWING.**

X 50 RU 242

Fig. 12 Transfer case shift pattern and warning plate

### STARTING INSTRUCTIONS

PARKING BRAKE MUST BE APPLIED FOR STARTING. TO ASSURE ADEQUATE TURBOCHARGER LUBRICATION, ENGINE SPEED SHOULD NOT EXCEED 1400 R.P.M. UNTIL OIL PRESSURE EXCEEDS 140 kPa (20 P.S.I.)

X 50 RU 239

X 50 RU 241

### CAUTION

IF EXHAUST TEMPERATURE EXCEEDS MAX., DOWNSHIFT. IF CONDITION OCCURS REPEATEDLY REPORT TO TECHNICAL AUTHORITY.

### ENGINE OPERATING RANGE 1200-2100 RPM

#### —CAUTION—

DO NOT OVERSPEED ENGINE. IDLE ENGINE 3 MIN. BEFORE SHUTDOWN. THESE INSTRUCTIONS MUST BE FOLLOWED OR SERIOUS DAMAGE MAY RESULT.

4MR 3001-P3

Fig. 13 Engine operating instruction plates

## Cabin seating

117. The vehicle is fitted with suspension seats with adjustments for seat cushion height and tilt, seat back angle, seat fore and aft movement and suspension unit loadings as detailed below.

## Adjustments

- (a) **Seat cushion height and tilt (Fig. 14 item 1)**
  - Height range: 65 mm in six steps
  - Tilt range: 11 degrees forward  
13 degrees rearward
- (b) **Seat back angle (Fig. 14 item 2)**
  - Forward tilt: 4 degrees
  - Rearward tilt: 60 degrees
  - Adjustment: 32 steps at 2 degrees increments
- (c) **Suspension Unit (Fig. 14 item 3)**
  - Load range: 60 kg to 130 kg
  - Load adjustment: Infinitely variable with visual indicator
  - Stroke: 80 mm. Hydraulic shock absorber and progressive bump stops.
- (d) **Seat slides (Fig. 14 item 4)**
  - Total movement: 175 mm
  - Adjustment: 11 steps at 17.3 mm increments

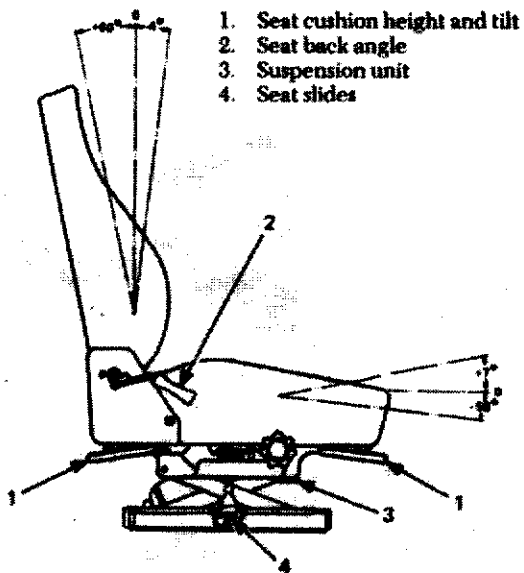
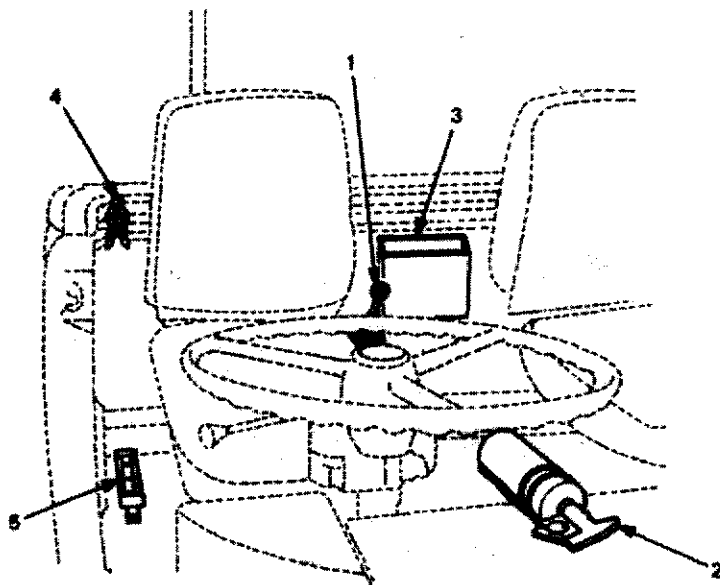


Fig. 14 Seating adjustment positions



- 1. Transfer case gear lever
- 2. Fire extinguisher
- 3. Document holder
- 4. Rifle clip
- 5. Butt box

Fig. 15 Controls and stowage — rear cabin area

## **Body and chassis fittings**

### **118. Vehicle body construction**

The vehicle cabin is fabricated from steel and is mounted on the chassis. The tray is fabricated from steel, and has an aluminium floor and features removable drop sides, demountable bench seating and a hinged tailgate. The tray extends to the crane at the rear of the spare wheel stowage. To convert the vehicle from a troop carrier to a tray top cargo carrier, use the following procedure:

- (a) Untie the canopy ropes from the tie-bar and unlace both ends of the canopy.
- (b) Unhook the stretch cord securing the canopy to the front, rear and side panels.
- (c) The canopy now can be removed by pulling from either side of the vehicle or by pulling from the rear of the vehicle.
- (d) Fold or roll the canopy on the ground.
- (e) Remove the retaining pins from either end of the tailgate and lower the tailgate.
- (f) Raise the seats and stow in the raised position using the retaining clips.
- (g) Remove the bow rails by lifting them individually from the mounting brackets.
- (h) To facilitate removal of the seat, first remove the retaining pin located in a vertical channel on the outside of the dropside panel, then lift the seat assembly up and out of the mounting brackets in the dropside panels.
- (i) Remove the pins holding the dropside panel in the vertical position from either end of the panel, and lower the side panel to the horizontal position. Push the side panel towards the rear of the vehicle, then lift the side panel off and away from the hinge.

#### **NOTE:**

The seat and the side panel can be removed as an assembly.

- (j) Repeat the above procedure with the other drop side panels.
- (k) To remove the front panel, first remove the retaining pin from the inner RH bracket located adjacent to the crane rear mounting, then lift the panel up and out of the mounting brackets.
- (l) The brackets used for holding the dropside panels in the vertical position can now be lifted out of their mounting brackets.
- (m) To remove the tailgate it will be necessary to lift the tailgate to the horizontal position, then push it towards the right hand side of the vehicle, it can now be lifted off the hinge and away from the vehicle.
- (n) Stow all removed items as directed.

### **119. Stowage**

Two lockable stowage bins of 0.23 m<sup>3</sup> volume each are fitted under the cargo tray on the left hand side of the vehicle.

### **120. POL stowage**

A tray type container is provided adjacent to the drivers cabin access step for the stowage of:—

- (a) Can, water, plastic 22 litre
- (b) Can, fuel, military, steel, 20 litre

### **121. Rifle clips and butt boxes (See fig. 16 items 4 and 5)**

A rifle mounting position is provided for both driver and passenger, these are located between seat and door.

### **122. Fire extinguisher (See fig. 16 item 2)**

A fire extinguisher is mounted on the floor between gear lever and passenger seat. In the event of a fire, remove the extinguisher from the mounting bracket, read the instructions, and use the extinguisher accordingly.

### **123. Deditching tools holder**

A deditching tool holder is provided for the stowage of:—

- (a) Mattock (pick) with handle, 2.3 kg
- (b) Axe
- (c) Shovel

This holder is mounted behind the cab, on the drivers side.

### **124. Rear steps**

A set of two bar steps is fitted to the bottom edge of the rear hinged tailgate to provide access to the rear of the platform body. The steps are automatically lowered with the tailgate. Cut-outs in the tailgate provide additional access steps onto the tray.

### **125. Load lashing points**

Lashing points are located as follows:

- (a) Load lashing rings. Nine load lashing rings each side are located on the outer edge of the tray in square shaped recesses.
- (b) Lashing rail. A load lashing rail is located along the lower edge of each body side.

### **126. Spare wheel stowage and lowering assembly (See fig. 16)**

- (a) The spare wheel is mounted behind the cabin on the left side of the vehicle.
- (b) A hand operated hydraulic jack, attached to a bell crank mechanism is used to lower and raise the spare wheel from its stowage position after the stowage clamp on the spare wheel arm is released. Observe warning decal.

- (c) Once the spare wheel is locked in the travelling position, the hydraulic pressure should be released from the jack.

**127. Electrical trailer connection socket**

A 12-pin NATO trailer socket connection is fitted to the rear of the vehicle to the left of the pintle and is wired in accordance with DEF (AUST) 5101 excepting for the blackout stoplight circuit which is connected through terminal F.

**128. Rear vision mirrors**

Hinged to fold inwards and lessen damage during cross country operations.

**129. Corner markers**

Fitted to the extremities of the front mudguards to aid clearance judgement.

**130. Bridge classification sign**

A bridge classification sign with the number 22 is attached. This sign is mounted on the front bumper.

**131. Towing pintle**

A Ring feder 663 K4D towing pintle is fitted to the rear cross member of the vehicle chassis.

**132. Unit/formation signs**

Four unit/formation sign holders are fitted to the vehicle.

**133. "C of G" designation plate**

A plate denoting the position of the longitudinal point of balance of the unladen vehicle is fitted on the left side of the body.

**WARNING**  
KEEP CLEAR OF DESCENT  
ARC WHEN LOWERING  
WHEEL.  
OPEN VALVE GRADUALLY  
TO CONTROL DESCENT

X 89 RU 246

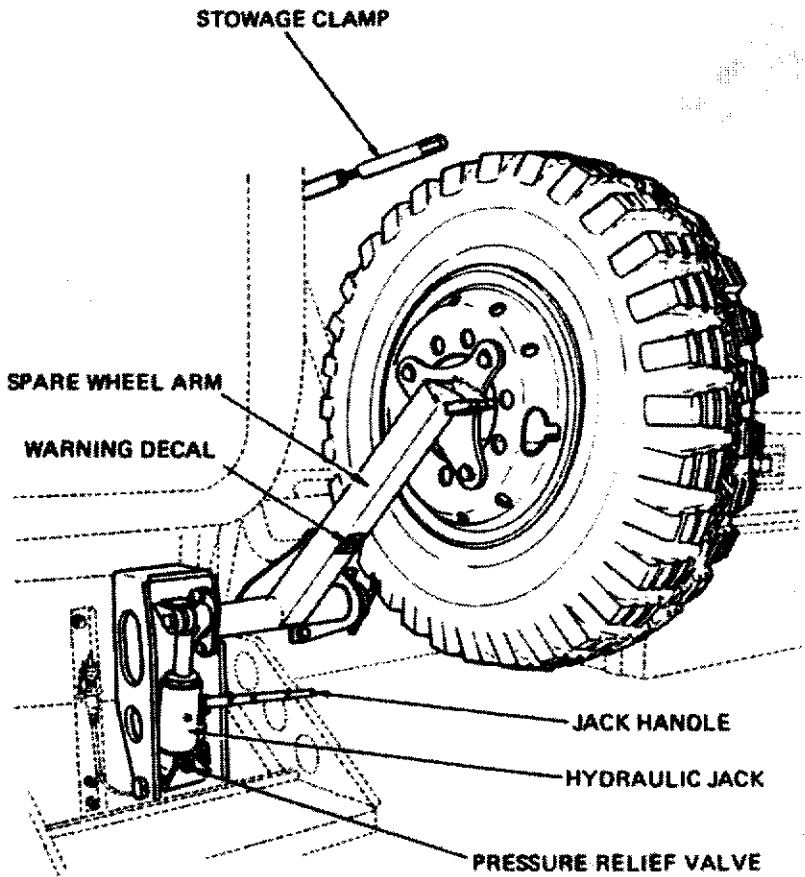


Fig. 16 Spare wheel storage and lowering assembly





# **CHAPTER TWO**

## **SECTION 1**

### **WARRANTY and REPAIR**

## Warranty

134. The period of warranty is detailed in Schedules A to E on pages 44 and 45 attached hereto and is as follows:

- (a) The Contractor accepts responsibility for warranty in respect of the entire vehicle for 12 months or 20 000 kms, whichever occurs first, and includes materials supplied by other manufacturers.
- (b) Notwithstanding the above, vehicle component parts as listed in the schedules hereto are warranted for the time specified after delivery of the vehicle to the user or for the distance or time specified in the schedules for which the vehicle has been operated, whichever first occurs. The repair or replacement of such parts shall be made in accordance with the terms of each schedule.
- (c) If the vehicles are delivered into store for long term storage, the operation of the warranty in respect of the entire vehicle, as provided under sub-paragraph (a) above, shall operate upon release from storage for the distances or time periods set out in the following table. Defects occurring during storage, such as leaking oil seals or attributable to other maintenance items, shall be rectified on completion of the storage period.

Time of Withdrawal from Storage (measured from day of delivery into storage)	Period of Warranty after Withdrawal from Storage	
	Distance (km)	Time (mths)
	(whichever expires first)	
First day of 1st month — last day of 3rd month	20 000	11
First day of 4th month — last day of 6th month	18 000	10
First day of 7th month — last day of 9th month	16 000	9
First day of 10th month — last day of 12th month	14 000	8
First day of 13th month — last day of 15th month	12 000	7
First day of 16th month — last day of 18th month	10 000	6
First day of 19th month — last day of 21st month	8 000	5
First day of 22nd month — last day of 24th month	6 000	4*
First day of 25th month — last day of 27th month	3 000	3*

\* Note: Notwithstanding the above table the warranty in respect of the entire vehicle shall cease to operate after the expiry of twenty seven months from the day of delivery into storage, regardless of any distance or time which has otherwise to expire.

## Warranty (Cont'd)

- (d) The operation of the warranty in respect of vehicle components parts, as listed in the schedules on pages 44 and 45 hereto and provided for under sub-paragraph (b) above, is suspended in the event of delivery of vehicles into store for long term storage for the period of the storage, up to a period of storage of twenty four months.

135. A noteworthy provision from Clause 24, "Warranty" of the Contract is:—

- (a) Excluding freight, warranty cover on failures within forty (40) km from a warranty agent (see page 46) is comprehensive. If warrantable repairs are necessary beyond 40 km from an agent, provision exists for Mack to either effect repairs through its nominated agent or authorize Army tradesmen to repair and subsequently claim reimbursement in accordance with Mack's standard warranty repair times and prevailing warranty labour rates.

136. **Warranty coverage and limitations**  
Schedule A through to E (See pages 44 and 45).

## Warranty Coverage and Limitations

SCHEDULE A	HOURS	MONTHS	KILOMETRES	PARTS	LABOUR
1. Mack Diesel Engine and Mack Transmission Basic Warranty	3600	24	161 000	100%	100%
2. Additional warranty for crankshaft, cylinder block, cylinder head castings, connecting rod forgings, camshaft, timing gears and Mack transmission case.	4 400	36	196 420	100%	90%
	5 200		231 840		80%
	6 000		267 260		70%
	6 800		302 680		60%
	7 600		339 710		50%
	8 400		375 130		40%
3. Consumables such as lubricant, anti-freeze, filter elements, belts, hoses and similar maintenance items not reusable and replaced directly as result of warrantable engine or transmission failure.	9 200	36	410 550	100%	30%
	10 000		445 970		20%
	10 800		483 000		10%
	10 800		483 000		—
	10 800		483 000		—
<b>SCHEDULE B</b>					
Cab * & Sheet Metal, Radiator, Clutch**, Vendor Transmissions, Rear Axle Carriers, Steering Gear, King Pins, Knuckles, Spindles, Brakes**, Drivelines, Wheel Bearings, Fuel Tanks.	—	12	0-40 250	100%	100%
* Fibreglass Cabs: 12 months, irrespective of distance travelled.	—		40 251-70 437	80%	80%
A** Clutch linings, brake linings, and brake drums are covered for 12 months or 40 250 km only.	—		70 438-100 625	60%	60%
	—		100 626-130 812	40%	40%
	—		130 813-161 000	20%	20%
	—	161 001 & Over	0%	0%	

A

## Warranty Coverage and Limitations (Continued)

	HOURS	MONTHS	KILOMETRES	PARTS	LABOUR
<b>SCHEDULE C**</b>					
Frame Crossmembers, Trunnion Bracket and Cross Shaft Suspension Trunnion (Except Bushings), Torque Arms (Except Bushings)	—	1 13-15 16-18 19-21 22-24 Over 24	0-40 250 40 251-110 687 110 688-181 125 181 126-251 562 251 563-322 000 322 001 & Over	100% 80% 60% 40% 20% 0%	100% 80% 60% 40% 20% 0%
<b>SCHEDULE D**</b>					
Frame Side Rails, Front Axle I-Beams, Rear Axle Housings ** Allowances from Schedules C and D are based on months or kilometres, whichever factor creates the lower percentage	—	12 13-18 19-24 25-30 31-36 Over 36	0-40 250 40 251-150 937 150 938-261 625 261 626-372 312 372 313-483 000 483 001 & Over	100% 80% 60% 40% 20% 0%	100% 80% 60% 40% 20% 0%
<b>SCHEDULE E</b> Mack Brand Batteries — 100% parts and labour, within 3 months. After 3 months, parts will be pre-rated on unused months between 3 and 18.					

## Examples of Items not covered by Warranty

### 137. Items not covered by warranty:

- (a) Abuse, accident or negligence.
- (b) Adjustment of brakes, clutches and controls.
- (c) Brake and clutch lining replacement for normal wear.
- (d) Damage in transit or from improper storage or industrial fall-out.
- (e) Duplication of repairs because of faulty diagnosis or workmanship.
- (f) Engine tune-up.
- (g) Down time and driver layover expense.
- (h) Headlight adjustment; sealed beam and bulb replacement.
- (i) Filter elements; including oil, fuel, air and water elements.
- (j) Fuel system cleaning.
- (k) Injection tip service or replacement for normal use and wear.
- (l) Labour charges for removal and replacement of service replacement parts.
- (m) Major component assembly replaced without prior authority.
- (n) Overtime and holiday labour, without prior authority.
- (o) Telephone, telegraph, teletype and other communications expense.
- (p) Towing (Recovery of vehicle to repair agency).
- (q) Transportation expense for obtaining replacement parts.
- (r) Unauthorized repairs — failures resulting from unauthorized alteration or the use of other than genuine or Mack approved parts.
- (s) Wheel alignment, wheel and tyre balancing and tyre rotation.
- (t) Oil and grease for refill or make-up.

### 138. Fuel injection pump and governor settings

Settings on the fuel injection pump and governor are fixed to specifications by Mack. Improper adjustments and settings other than those specified are not permitted. Fastener seals on these sub-assemblies are not to be broken. Damage resulting from improper adjustments or when seals are broken, will not be covered by warranty.

## List of Agents

Names of Firms for Towns/Cities	Status
<b>Queensland (1 MD)</b>	
Brisbane (07-3722333) Mack Trucks Australia Pty Ltd Richlands Qld. 4077 Cnr Archerfield and Boundary Rds (Telex AA42306)	Company Headquarters
Mackay (079-511522) Depinto Motors (A division of A.W. Rasmussen Pty Ltd) Milton Street Mackay Qld. 4740	Service Centre
Mt. Isa (077-434001) Plumb Diesel Service 3 Holly Street Mt. Isa Qld. 4825	Service Centre
Rockhampton Nth. (079-274682) Chippendale Motor Co. Pty Ltd Cnr Yaamba Rd and Cowap St. Rockhampton Qld. 4701 (Telex AA49007)	Dealer
Toowoomba (076-343811) Westco Truck Sales Anzac Avenue Toowoomba Qld. 4350	Dealer
Townsville (077-793822) Sigi Graf Pty Ltd Cnr Hugh and Harwood Streets Currajong Qld. 4812	Dealer
<b>New South Wales (2 MD)</b>	
Albury (060-252566) D. & B. Diesel Engineers Dallinger Road Lavington NSW 2641	Service Centre



## List of Agents (Cont'd)

Names of Firms for Towns/Cities	Status
Broadmeadow (049-614117) R. W. Brown & Co Pty Ltd 65-73 Bruncker Road Broadmeadow NSW 2292	Dealer
Coffs Harbour (066-522453) S & T Mechanical Engineering Pacific Highway Coffs Harbour NSW 2450	Service Centre
Dubbo (068-885111) Brocklehurst Motors Burraway Road Brocklehurst NSW 2830	Service Centre
Eden (0649-61163) Rankins Motor Repairs 14 Weecoon Street Eden NSW 2551	Service Centre
Liverpool (02-7273233) Mack Trucks Australia Pty Ltd Cnr Gordon & Alfred Roads Chipping Norton NSW 2170 (Telex AA220839)	Company Branch
Tamworth (067-658138) Bermic Truck Services Pty Ltd 244 Goonoo Goonoo Road New England Highway South Tamworth NSW 2340	Dealer
Ulladulla (044-551088) W. G. Kelly Pty Ltd Blackburn Road Ulladulla NSW 2539	Service Centre
Wagga (069-251413) (069-254374) West End Wagga Pty Ltd 360 Edward Street Wagga Wagga NSW 2650	Service Centre

## List of Agents (Cont'd)

Names of Firms for Towns/Cities	Status
<p>Wollongong (042-2908433) Compass Car &amp; Truck Centre Princess Highway North Wollongong NSW 2500</p>	Dealer
<p><b>Victoria (3 MD)</b></p>	
<p>Ballarat (053-347540) Doug Peterkin Diesels Coulsons Road Warrenheip Vic 3352</p>	Service Centre
<p>Bendigo (054-484401) Midland Truck Spares 319 Eaglehawk Road Bendigo Vic 3350</p>	Service Centre
<p>Dandenong (03-7031855) Eastern Mack Truck Sales (Vic.) Pty Ltd Lot 18 Frankston Road Dandenong Vic. 3175</p>	Dealer
<p>Melbourne (03-3594711) Mack Trucks Australia Pty Ltd 1850 Hume Highway Campbellfield Vic 3061</p>	Company Branch
<p>Shepparton (058-231303) Transport Components Pty Ltd Goulbourn Valley Highway Shepparton South Vic 3630</p>	Service Centre
<p><b>South Australia (4 MD)</b></p>	
<p>Adelaide (08-2602433) Mack Trucks Australia Pty Ltd 585 South Road Regency Park S.A. 5010 (Telex AA88359)</p>	Company Branch

## List of Agents (Cont'd)

Names of Firms for Towns/Cities	Status
<p><b>Northern Territory (6 MD)</b></p> <p>Darwin (089-8403588) Mack Trucks Australia Pty Ltd Stuart Highway Winnellie NT 5789 (Telex AA85179)</p>	Company Branch
<p><b>Tasmania (7 MD)</b></p> <p>Hobart (002-380200) Webster Machinery Pty Ltd 60 Liverpool Road Hobart Tas 7000 (Telex AA57124)</p>	Distributor
<p>Launceston (003-263540) Webster Machinery Pty Ltd East Tamar Highway Rocherlea Tas 7250</p>	Distributor
<p><b>Western Australia (5 MD)</b></p> <p>Perth (09-2771233) Malcolm Moore Pty Ltd 80 Great Eastern Highway South Guilford WA 6055 (Telex AA93308)</p>	Distributor
<p><b>Canberra</b></p> <p>Canberra (062-413381) Petersons Automotive Service 25 Kemble Court Mitchell ACT 2911</p>	Service Centre

# **CHAPTER TWO**

## **SECTION 2**

### **OPERATING INSTRUCTIONS**

# VEHICLE OPERATION

## 139. General

Proper operation determines the service life and operating economy of the vehicle. This includes, careful driving, normal road speeds, reasonable rates of acceleration and braking; also shifting in a manner to avoid shock loading and labouring.

## 140. Before starting

Carry out first parade service as detailed in Chapter three — Section one.

## 141. Before starting engine

Set parking brake. Depress clutch pedal fully to disengage clutch. Move gear shift lever to neutral.

## 142. Starting engine

Turn ignition switch on so instruments will operate. With engine stop control pushed "IN" to running position, clutch pedal fully depressed and accelerator pedal approximately half way, engage air starter. When starting vehicle with no air registering on gauges, hand throttle is to be pulled part way out approximately 15 mm or 4 to 5 turns counter clockwise.

## NOTES

Before shutting down and parking ensure air pressure is at maximum 830 kPa.

As the turbocharger operates at high speeds, lubrication at start up and shutdown is of primary importance. Any excessive revving of the engine immediately after starting up, can damage the turbocharger. Likewise, when preparing to shutdown after a long haul, idle engine for three minutes to ensure that turbocharger is rotating slowly. This idling period dissipates heat build up and prevents early turbocharger failure.

If necessary to idle for extended periods, set at fast idle, about 800 rpm with hand throttle. Unnecessary idling for long periods of time wastes fuel, fouls injector nozzles and unburned fuel causes carbon formation, glazing of cylinder bores and oil dilution.

Racing engine. Never race an engine during warm-up period. Never operate engine beyond governed speed (as in downhill overrun operation). Engine bearings, pistons and valves will be damaged if these precautions are not taken.

To aid starting in sub-zero temperatures, use the hand throttle as described in paragraph 142 above. Allowing the engine to fast idle (max. 1400 rpm) for several minutes before returning the hand throttle to normal idle position.

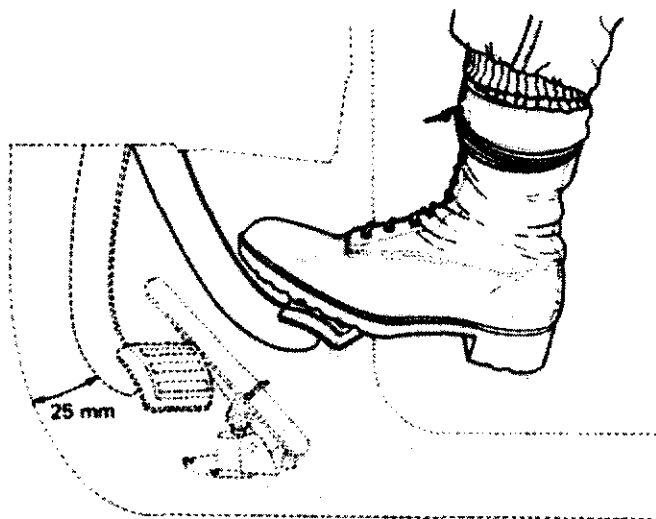
#### 143. Moving vehicle

- (a) Engine operating.
- (b) Disengage clutch by pushing pedal to the floor to energise clutch brake.
- (c) Shift transmission into first or second gear, depending on load and terrain conditions.
- (d) Release parking brake. If spring brake warning light is on indicating rear brakes are not released, do not attempt to move the vehicle as drive line damage will result.
- (e) Engage clutch smoothly by releasing clutch pedal. At the same time, push accelerator down the amount necessary for the engine to move the load.

#### CAUTION

Never allow the foot to "RIDE" the clutch pedal with clutch engaged — this causes premature release bearing failure and short clutch facing life.

- (f) As the vehicle gains speed, continue shifting until cruising speed is reached and the transmission is in the highest gear possible with engine in the normal operating range, remembering that "double-clutching" is required at all times.
- (g) Clutch brake. A clutch brake is mounted on the primary shaft of the transmission and is connected to the clutch discs. The action of the clutch brake overcomes the tendency of the clutch discs to continue to rotate at high speed when the clutch is disengaged. The clutch brake operates on the last 25 mm of pedal travel, and is to be used for gear engagement only while the vehicle is stationary. "Double-clutching" should be used on all shifts (see fig. 17).



**Fig. 17 Clutch brake operation**

- (h) The EM6-285 engine operating range is 1200 to 2100 rpm. It is not possible to make a clean downshift before the engine rpm drops to 1200 to 1400 rpm and downshifting above this engine speed will result in engine overspeed and possible engine damage. On an upshift, the engine rpm should be allowed to drop to 1400 to 1500 rpm before engaging higher gear.

## **Good driving habits**

### **144. Engine temperature**

Before entering high speed traffic conditions, allow engine to reach operating temperature. Normal temperature is between 80 to 85 degrees C. Don't remove radiator pressure cap or add coolant when engine is overheated.

### **145. Instruments**

Glance at instruments frequently. When trouble is indicated, take prompt action to correct.

### **146. Clutch**

To avoid damage, engage without "shock loading" the drive line, especially on grades with loads.

Don't ride the clutch pedal.

### **147. Shifting**

Avoid gear clashing by synchronizing engine and vehicle speeds. Do not permit load to drive engine above governed speed. Use correct gear to suit vehicle speed and loads. Use same gear down-hill as up-hill.

#### **148. Braking**

Avoid sudden stops. When stopping on slippery surfaces, alternately and smoothly apply and release the brakes to prevent skidding. When slowing for a stop, leave clutch engaged as long as possible to utilize the braking effect of the engine. Disengage clutch when engine rpm has dropped to a little above idling speed.

#### **149. Braking with Dynatard (Engine brake)**

When travelling downhill, select gear to allow the weight of the vehicle to be held by engine brake without excessive use of the service brakes. (DO NOT EXCEED 2100 rpm) (See Engine brake description, Chapter one, Section three)

#### **150. Stopping the engine**

After a hard run, allow engine to idle for three minutes before shut-down in order to stabilize the temperature of all engine parts, particularly the turbocharger.

#### **151. Parking**

Use parking brake (emergency brake) for parking. Check frequently to be certain brake is adjusted to lock and hold vehicle when parked. Do not use for braking vehicle when in motion except in an emergency. When parking on a grade, do not leave vehicle in gear; use safety precautions. Be sure engine stop knob is left in the "OUT" (engine stopped) position to prevent engine from accidentally starting.

#### **152. Loading**

Remember safety first when loading vehicle. Check that load does not exceed vehicle capacity. Keep load as low as possible, by utilizing maximum floor area. Situate load as far forward as possible. Always securely fasten loads. When loading/unloading using the vehicle crane observe crane operating instructions and exercise extreme caution.

### **Emergency procedures**

#### **153. Starting (No air)**

Before attempting emergency starting, recitify cause of fault. Set parking brake. If the air start reservoir is empty and another vehicle is not available, the vehicle may be started by utilizing the air charging hose to supply air to the air start reservoir from the tyres fitted to the vehicle.

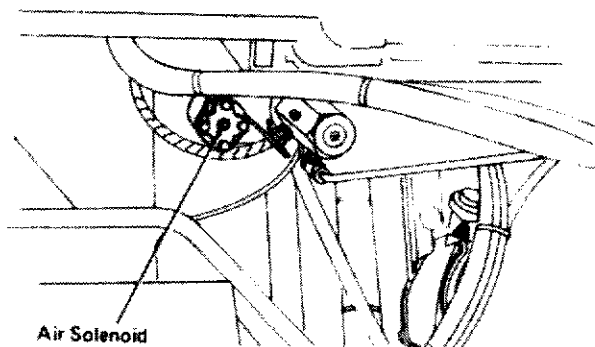
- (a) The air start reservoir should be charged with air from at least four tyres.
- (b) Ensure tyres are inflated as soon as the vehicle is re-started.



- (c) When this operation is necessary, it is suggested that the four inner tyres of the duals be used.
- (d) Air supply is also available from the tyre inflation point (left hand side). This air comes from the brake system. Providing the brake system is charged to operating pressure, sufficient air should be available to charge air start reservoir.

**154. Starting (flat batteries)**

- (a) Set parking brake and place gear lever in neutral position.
- (b) Set engine stop control to "run" position.
- (c) Turn ignition switch to "ON" position.
- (d) If necessary, set hand throttle to desired setting (4 to 5 turns counter clockwise).
- (e) Reaching under the left hand side of the vehicle adjacent to the side step. Insert a suitable implement in the air solenoid and push in. This solenoid is located under the passenger floor above chassis rail (see fig 18).
- (f) Engine should now start.
- (g) Note reading on voltmeter.



**Fig. 18 Air solenoid**

**155. Service and trailer brakes**

- (a) Loss of primary air supply.  
Loss of primary air system (to the rear brakes) leaves the vehicle with the secondary front brake system operational. This condition will produce a "low pressure" indication by buzzer and warning light. A brake application makes the spring brake control valve responsive to the secondary signal system. The valve will respond by automatically modulating the rear spring brakes.

**ACTION REQUIRED.** Confirm by visual observation of the dual pressure gauge that the primary air supply has failed (green needle). Move vehicle with extreme care to the nearest safe parking area and effect repair or recovery.

- (b) Loss of secondary air supply.

Loss of the secondary air supply will be observed on the dash mounted dual pressure gauge (red needle) and indicates that the front brakes are not serviceable.

**ACTION REQUIRED.** Proceed to the nearest safe parking area with extreme caution, and effect repair or recovery.

- (c) Loss of both primary and secondary air supply, will result in automatic application of the spring brakes and trailer brakes.

The reserve air supply should now be activated.

- (i) Push in reserve air button.
- (ii) Release park brake (if already engaged).
- (iii) If trailer fitted, push Tractor Protection switch in and hold until trailer brakes are released, thus allowing button to stay in and releasing trailer brakes.
- (iv) Vehicle braking is now controlled by park brake control (emergency brake) or hand control if trailer fitted.

**ACTION REQUIRED.** Vehicle should not be moved, except when it is an obstruction to traffic and then only moved sufficiently so as not to cause an obstruction. Seek repair or recovery action.

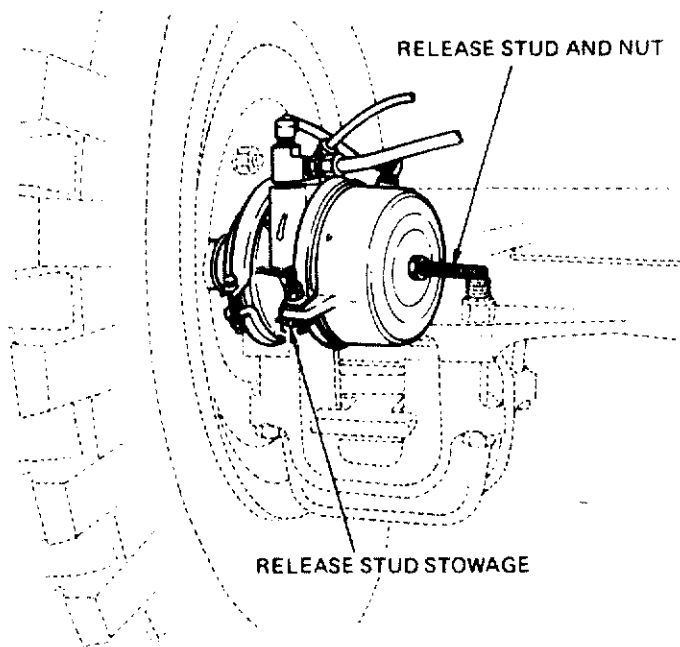
- (d) Complete air brake system failure, i.e. a total loss of air from the primary, secondary and reserve air systems.

A total air brake system failure will result in the immediate application of the spring brakes on the vehicle and trailer (if fitted). However the spring brakes cannot be released in the manner described in paragraph (c).

**ACTION REQUIRED.** The spring brakes must be released by the following method.

- (i) Chock wheels to prevent vehicle moving.
- (ii) Remove rubber cap from the compression spring chambers.
- (iii) Remove release stud from the brake chamber side pocket and insert into the pressure plate receptacle within the compression spring chamber.
- (iv) Turn the release stud quarter of a turn to seat cross pin into pressure plate receptacle.
- (v) Refit nut to the stud and turn with a spanner until the compression spring is caged.
- (vi) Repeat this operation at other wheels, releasing all spring brakes. (see fig. 19)

**WARNING**  
Vehicle now has NO brakes, and  
should be recovered to a safe working  
area.



**Fig. 19 Spring brake chamber**

## Changing a wheel

156. To replace a flat tyre with the spare wheel proceed as follows:

### NOTE

Before proceeding with changing the wheel, ensure that the vehicle is on flat, level ground and not obstructing traffic.

- (a) Remove the hydraulic jack and handle, the base plate, wheel brace and lever, and the two blocks of wood from the tool box.
- (b) Remove the spare wheel by first placing the jack handle in the hydraulic jack used for raising and lowering the spare wheel, and pumping up pressure in the jack. Only then release the stowage clamp from the spare wheel arm and pull the wheel towards you. Slowly release the pressure from the hydraulic jack and lower the spare wheel to the ground. Remove the nuts retaining the wheel to the spare wheel arm and remove the wheel from the arm (see fig. 16).
- (c) Slacken the wheel nuts on the wheel with the flat tyre using the wheel brace and lever.

### NOTE

Wheel nuts on the passenger side of the vehicle have left-hand threads and those on the driver's side have right-hand threads.

- (d) Place a block of wood in front of the wheel, then start the vehicle and drive the wheel on to the block of wood.
- (e) Apply the parking brake and install chocks to a wheel not being removed.
- (f) Place the jack base plate on the ground beneath the axle from which the flat tyre is being removed. Place the second block of wood on the baseplate and install the jack on top of the wood (see fig. 20) and install directly under the axle.

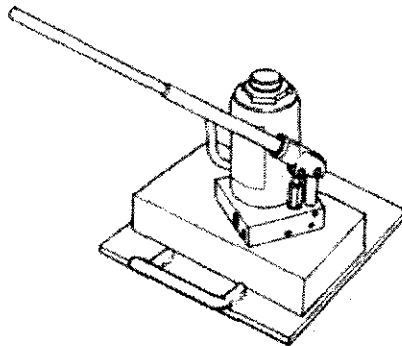


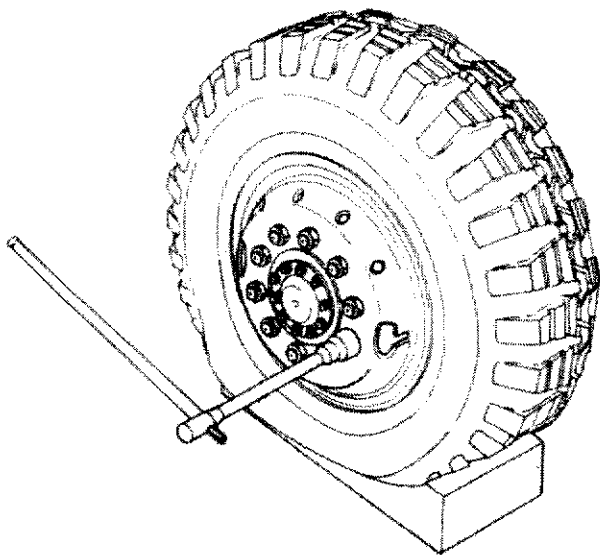
Fig. 20 Hydraulic jack, base and block of wood

- (g) Install the jack handle and pump the jack up to raise the axle until the wheel is clear of the block of wood.

**NOTE**

Ensure the jack is secure before attempting to remove the wheel from the axle.

- (h) Remove the block of wood.
- (i) Remove the wheel nuts and remove the wheel from the axle (see fig. 21).



**Fig. 21 Removing wheel nuts**

- (j) Install the spare wheel on axle and install wheel nuts.
- (k) Tighten the wheel nuts in correct sequence (diagonally opposites) to ensure the wheel is centred on the axle.
- (l) Check that everything is clear from under the vehicle, then lower the axle by opening the pressure relief valve located in the base of the jack, until the wheel rests on the ground.
- (m) Remove the baseplate, block of wood and jack out from under the vehicle.
- (n) Remove wheel chocks.
- (o) Using the wheelbrace and lever tighten the wheel nuts as tight as possible by hand. **DO NOT** stand on bar.
- (p) Install the wheel with the flat tyre onto the spare wheel arm, raise the arm and secure in position with the stowage clamp.

- (q) Release the pressure from the jack once the wheel is clamped in position.
- (r) Stow all tools and equipment used in the tool box.

#### CAUTION

It is mandatory to retighten the wheel nuts after travelling approximately 40 km

#### NOTE

The use of the blocks of wood applies mainly to the front wheels. However, if an outer wheel on the rear bogie needs replacing, an acceptable time saving method is to run the inner wheel of that axle onto a block of wood. In so doing the outer wheel is lifted clear of the ground facilitating the removal of the wheel. If an inner wheel needs to be replaced, the axle will have to be lifted by means of the hydraulic jack. After replacing the wheel, recheck the tightness of the wheel nuts after travelling the next 40 km. Before checking inner wheel nuts it is essential to loosen the outer wheel nuts. After tightening the inner wheel nuts, retighten the outer nuts which must be rechecked after a further 40 km.

## Crane Operation

### 157. Preparation

For proper and efficient operation of the crane the following points must be adhered to: —

- (a) Operate the crane as per instructions on the signs (See fig. 22 and 23).
- (b) Move the control handles gently to avoid jerky movements.
- (c) To ensure maximum stability, the ground under both stabilizers must be firm.
- (d) If possible, avoid operating the crane on other than level ground as stability is reduced.
- (e) If operating on a gradient, ensure that the vehicle is facing uphill and not along it.
- (f) If operating in confined spaces, extreme care should be taken.

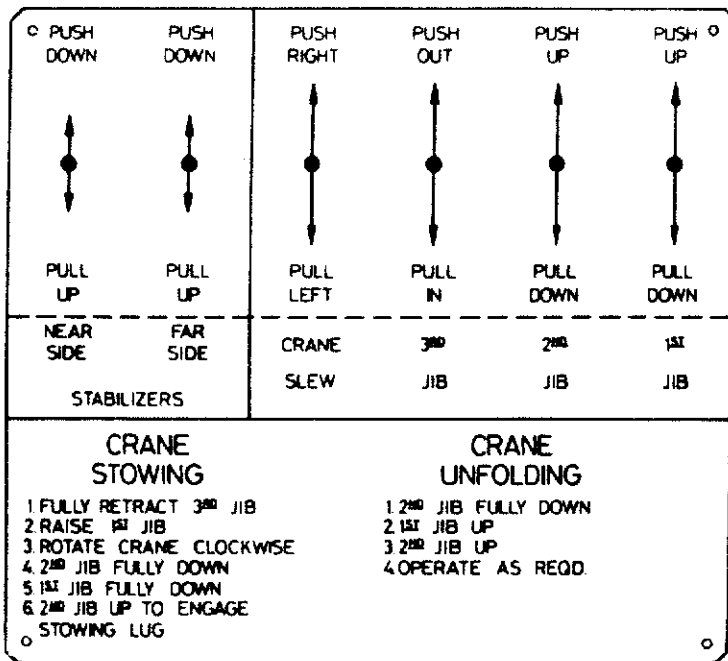


Fig. 22 Crane operating instructions

## Operating instructions

### WARNING

As with any lifting machine a vehicle mounted crane is dangerous if operated incorrectly, therefore it is essential that the operator exercises extreme caution to avoid mistakes which may result in personal injury or property damage. The crane should be operated by trained personnel.

### 158. Crane engagement instructions (See fig. 23)

The vehicle must be completely stabilized before the crane is operated under load.

- The vehicle must be stationary.
- The park brake must be applied (fig. 7 item 29).
- Place transmission and transfer case levers in neutral position.
- With engine idling, engage PTO and set hand throttle at 1100 rpm (fig. 7 items 33 and 21), PTO engagement light will light up when PTO lever is moved to the "ON" position (fig. 7 item 34).

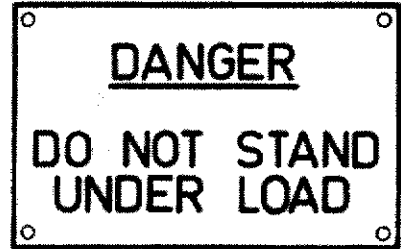
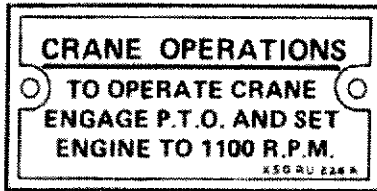
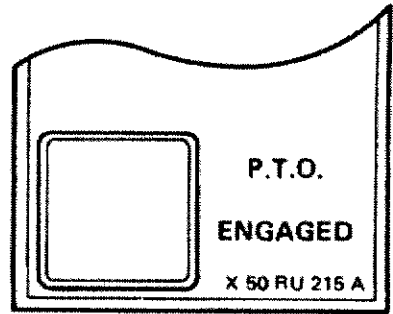
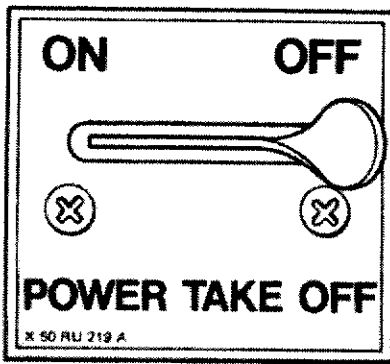


Fig. 23 Crane engagement instructions

**159. Lowering the stabilizers**

- (a) Remove lynch pin from locking pin at the base of the stabilizer.
- (b) Remove locking pin and lower inner extension box assembly (fig. 24).

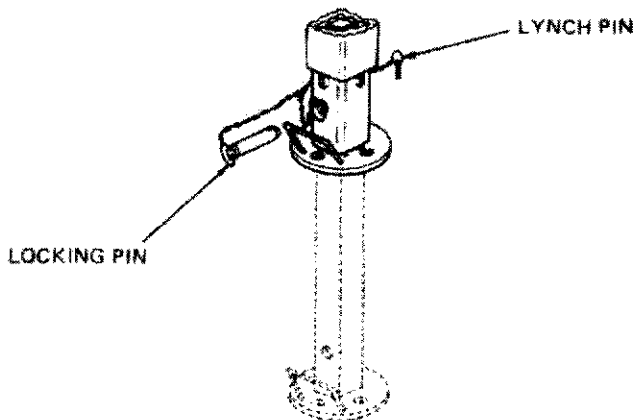


Fig. 24 Stabilizer and locking pin



- (c) Relocate locking pin and lynch pin in new position.
- (d) Using the controls situated adjacent to the stabilizer (Fig. 22), move the stabilizer control to the "DOWN" position until the stabilizer pad touches the ground.
- (e) Repeat operation for opposite side stabilizer.

#### NOTE

When loading the vehicle the stabilizer must make firm contact with the ground. When unloading the vehicle the stabilizer should be lowered such that it raises the vehicle tray at least 75 mm.

- (f) After the stabilizer has been extended to the correct position, release the control handle allowing it to return to the neutral position.

#### 160. Crane unfolding (See fig. 22)

The control handles for the operation of the crane are located at both sides of the crane adjacent to the stabilizer arms. Instructions for their proper use are affixed.

#### NOTE

Before unfolding the crane position the stabilizers.

- (a) Move control lever of second jib to "DOWN" position until there is no more movement. (This lifts the nose of the second jib up).
- (b) Move control lever of first jib to "UP" position until jib points up 60° from horizontal.
- (c) Move control lever of second jib to "UP" position. This brings second jib out of stow position.
- (d) Crane is now operational. Operate within the capabilities of the crane (See fig. 25).

#### CAUTION

When slewing in a loaded crane, start and stop the movements gently, especially when handling a swinging load.

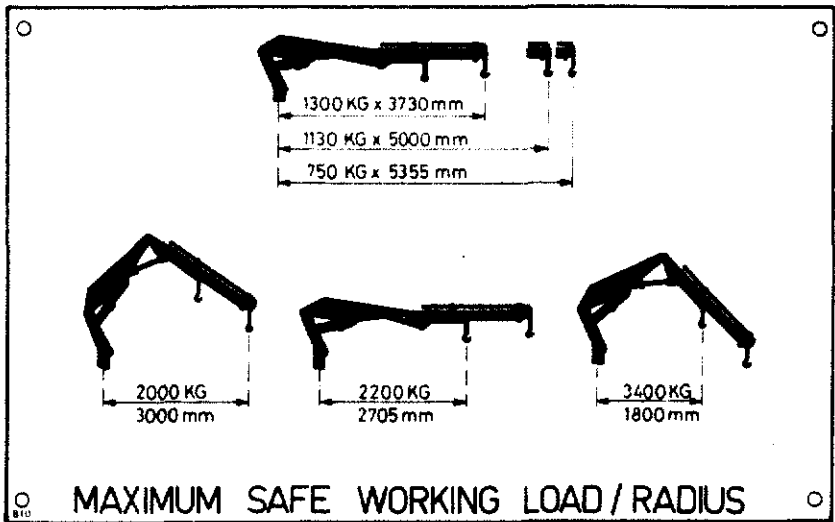


Fig. 25 Crane maximum safe working load/radius

**161. Crane stowing (See fig. 22)**

- (a) Move control lever of third jib to "IN" position, hold lever until jib is fully housed.
- (b) Move control lever of first jib to "UP" position and hold until first jib is elevated at least 60° from horizontal.
- (c) Slew crane until the jibs are 90° to vehicles driveline and jibs are in a straight line and above the stabilizers.
- (d) Move control of second jib to "DOWN" position and hold, tucking the second jib below the first.
- (e) Move control lever of first jib to "DOWN" position and hold until fully stowed.

**NOTE**

Watch hook does not become entangled.

- (f) Move control lever of second jib to "UP" position carefully. Jib will engage in stowing lug.

**162. Stowing the stabilizers**

Before stowing the stabilizers, the crane must be in the stowed position.

- (a) Move stabilizer control handle to "UP" position, this raises the stabilizer foot (See fig. 22).

### WARNING

The correct control handle must be selected so as not to cause a possible mishap.

- (b) Should tilt become excessive during repositioning of stabilizer, release opposite stabilizer slowly to counteract tilt.
- (c) When the stabilizer has been retracted to the correct position, release the control handle allowing it to move back to the neutral position.
- (d) Remove lynch pin from locking pin, and supporting stabilizer extension housing, remove locking pin.
- (e) Push in extension housing, reposition locking pin in travelling position and insert lynch pin.
- (f) Reposition opposite stabilizer to travelling position.

### WARNING

Care must be taken when operating the control handles for the purpose of stabilization to avoid any dangerous movement of the jibs.

- (g) Release hand throttle to bring engine rpm back to idle.
- (h) Disengage PTO (See fig. 23).
- (i) If vehicle has been loaded and loads require securing, this must be done before moving off.

# **CHAPTER THREE**

## **SECTION 1**

### **SERVICING**



- (b) Oil pressure                      Check for minimum of 175 kPa at idle and 275kPa to 660 kPa at maximum r.p.m.
- (c) Voltmeter                        With switch on and engine off, or engine running, any irregular readings indicates batteries or charging system requires checking.
- (d) Horns                              Check operation of both electric and air horns.
- (e) Lights                              Check operation of all lights.
- (f) Windshield wipers/washers      Check operation. Add water, if needed.
- (g) Parking brake                    Check release, holding ability and application.
- (h) Clutch pedal                      Check for free travel.
- (i) Air cleaner restriction gauge      If gauge is fully locked in "red" position, reset the indicator, and if the condition is repeated report to technical authority.
- (j) Seat adjustment                  Ensure seat is correctly adjusted.
- (k) Records                            Complete documentation.

**Electrical**  
**169.**

- (a) Batteries                          Check electrolyte level — fill to 10 mm above plates.  
Check that terminals are tight and clean.
- (b) Lights                              Switch off all lights not required.

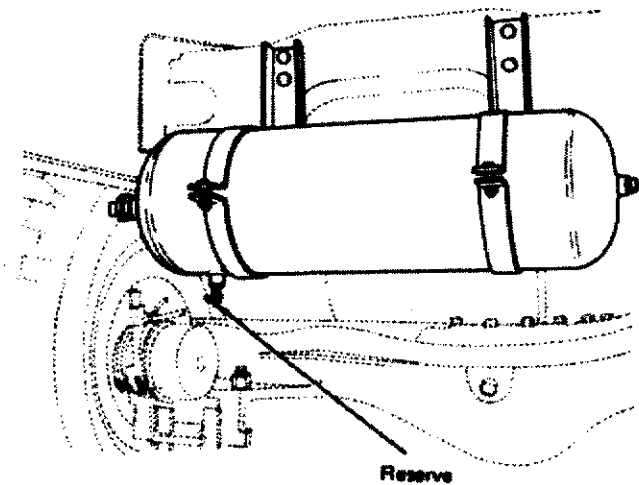
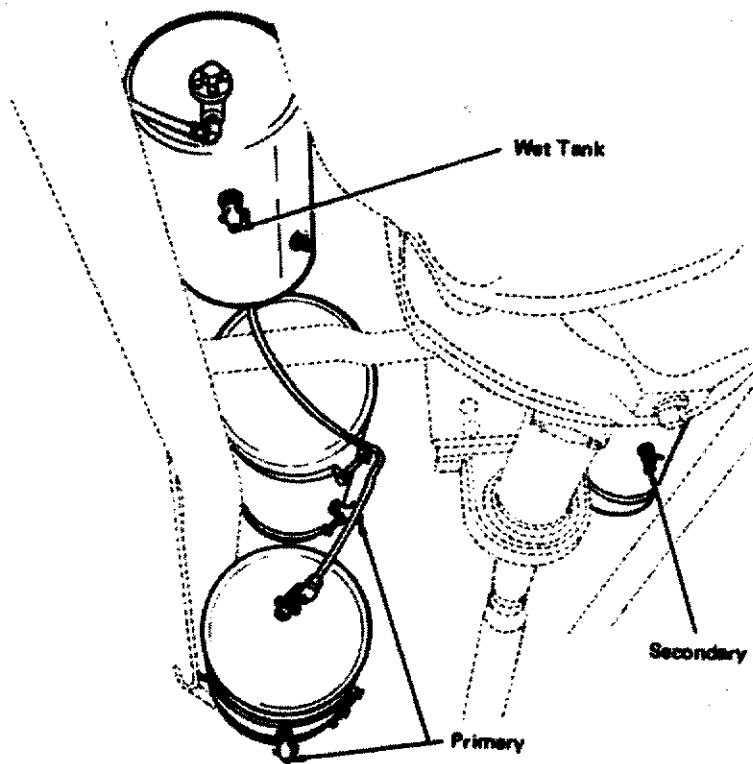
## Brake system reservoirs (Fig. 26)

170. Slightly open the drain valves on the wet tank, primary, secondary, and reserve brake reservoirs to expel accumulated moisture due to condensation.

Location of reservoirs; wet tank, inside chassis rail, left hand side, slightly forward of transfer case, primary tanks (2 off), left hand side forward of wet tank, secondary tank, right hand side, opposite primary tanks, reserve tank, on the cross-member behind the rear axle.

### NOTE

When de-watering each reservoir, be sure to slightly open the valve slowly to prevent the forming of an air channel. This channel would empty only air from the reservoir and hold back water. It is not unusual to find a trace of oil in the water expelled from the reservoir, however, excessive oil indicates compressor trouble. Ensure that the reservoirs are fully charged before draining.



**Fig. 26 Position of wet tank, primary, secondary and reserve air brake reservoirs**



## **Moving off and running**

171.

- (a) Load — Make a final check of the security of load and lashings.
- (b) Moving off — Release parking brake. Check correct operation of steering and brakes. **DO NOT** move off until air buzzer stops and low pressure warning light goes out.
- (c) Running periods — Keep a running check on all instruments. Check the fuel level, engine oil pressure, coolant temperature, charging rate and speedometer at intervals.

## **Halts on the march**

172. At halts on the march check that:—

- (a) The cargo and lashings are secure.
- (b) No tyre is soft, punctured or overheated.
- (c) Wheel hubs or brake drums are not overheated (check with back of hand or finger).
- (d) There are no oil, fuel or coolant leaks.

173. At halts or after approximately four hours running

- (a) Check tyre pressures. If low, inflate. (If high, check later when tyres are cold, before deflating).
- (b) Ensure that all wheel nuts are secure.
- (c) Test all lights (especially if there is a possibility that they will be required).
- (d) Check generally for loose bolts or fittings. Tighten as necessary.
- (e) Ensure security of stowed items.
- (f) Inspect for security and correct operation any parts on which recent repairs or adjustments have been carried out.

## **Last parade servicing**

174.

- (a) Clean the vehicle.
- (b) Carry out reservoir de-watering routing (See para 170).
- (c) Carry out "halt on the march" servicing.
- (d) Draw fuel and lubricants, as required and top up fuel tank, engine oil and radiator coolant. If operating under very dusty conditions, the lower pan of the air cleaners should be removed and cleaned then check the restriction indicator gauge mounted on the air cleaner and **REPORT** if it shows **RED**.
- (e) If vehicle has been subjected to deep water crossings during daily exercise, the oils in the front hubs, front and rear axles, transmission and transfer case, should be checked for signs of water contamination. If any traces of water are found, the oil should be drained and replenished with correct type as soon as possible.
- (f) Check radiator core for insects, mud etc., clean as required with compressed air or water from the engine side of the radiator.
- (g) Complete documentation.

- (h) Close cab doors and windows and lace up canopy flaps, etc. If parking in hot conditions, one window could be left down approx. 13 mm to minimise heat build up within the cab.

### Opening bonnet and mudguard for servicing access

175.

- (a) Unhook retaining straps and raise bonnet sides and position supporting rod.
- (b) If further accessibility is necessary, disconnect cable at multiple connector located on inner flange of mudguard under bonnet, then remove the four capscrews on the rear of the mudguard (just forward of the air cleaner) and the four capscrews vertically adjacent to the radiator (above the unit sign holder).
- (c) Disconnect spring between inner guard and chassis rail (rubber apron).
- (d) On the left hand side it is necessary to disconnect the air horn supply hose.
- (e) Mudguard can now be tilted forward.

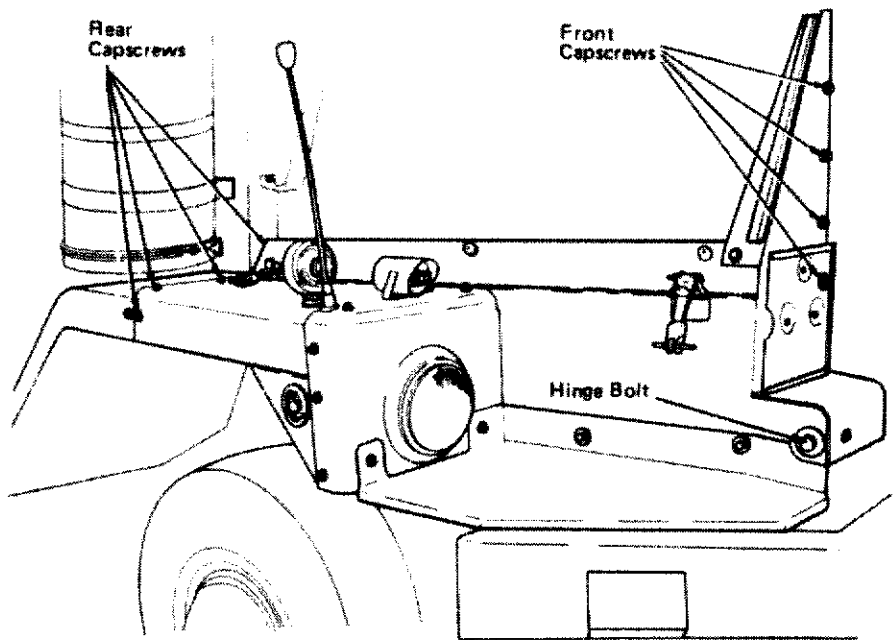


Fig. 27 Location of mudguard access bolts

# PERIODICAL MAINTENANCE

## Periodical maintenance

176.

- (a) To ensure that the vehicle is correctly maintained and fit for operational tasks, it is necessary to carry out regular maintenance.
- (b) Daily and Fortnightly Servicing in accordance with Tables 2 and 3 is to be carried out by operators and is the responsibility of owner units.
- (c) Initial, Minor and Major Servicing is to be carried out by RAEME with assistance from operators working under RAEME supervision in accordance with Tables 4, 5 and 6. The unit is responsible for ensuring that the vehicle is serviced at the following intervals:
  - (i) **Initial Service.** This is to be carried out on a new vehicle at the completion of the first three months or 5000 km of operation, whichever occurs first.
  - (ii) **Minor Service.** This is to be carried out every six months or 10 000 km of operation whichever occurs first.
  - (iii) **Major Service.** This is to be carried out every twelve months or 20 000 km of operation, whichever occurs first.

## Special Requirements

177. During the early life of a vehicle the working parts settle down, with the result that various clearances and adjustments need to be corrected. Operators should report problems for rectification at the earliest opportunity.

178. The front and rear spring 'U' bolts been retorqued on the receipt service and are to be retorqued again on the initial service.

179. The Initial Service includes a warranty inspection which must be reported to Mack Trucks Australia in accordance with EMEI VEHICLE A 119-21.

**Table 2****Daily Tasks**

<p>The following operations are to be performed by the driver:—</p> <ol style="list-style-type: none"><li>1. Check engine oil level (Top-up if necessary)</li><li>2. Check coolant level (Top-up if necessary)</li><li>3. Check tyres and wheels, Inflate tyres if necessary, inspect wheel nuts for evidence of looseness.</li><li>4. Slightly open drain valves slowly on all brake air reservoirs.</li><li>5. Check for air, fuel, oil and coolant leaks.</li><li>6. Check fuel supply and operation of fuel gauge.</li><li>7. With engine running check that air buzzer and low air pressure light switch off when air pressure reaches 480 kPa.</li><li>8. Check oil pressure at idle, minimum 175 kPa and with engine running at governed speed, pressure should read 275 to 660 kPa.</li><li>9. Check voltmeter reading, with switch on and engine off, indicates battery condition. With engine running reading indicates condition of charging system.</li><li>10. Check operation of electric and air horns.</li><li>11. Check all lights for correct operation and report any defects.</li></ol>	<ol style="list-style-type: none"><li>12. Check clutch pedal for correct free travel.</li><li>13. Check parking brake for application, release and holding ability.</li><li>14. Check coolant temperature gauge reading normal reading 80° to 85° C.</li><li>15. Check operation of windscreen wipers and washers, top-up washer reservoir if required. Reservoir located in drivers door panel.</li><li>16. Check air cleaner restriction gauge reading, if locked in "red" position the air cleaner element must be changed. Under dusty conditions, remove and clean lower pan.</li><li>17. Check seats and seat belts for operation and security.</li><li>18. Check driving mirrors, door windows, catches and latches.</li><li>19. Check security of crane.</li></ol>
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### Table 3 Fortnightly Tasks

The following operations are to be performed by the driver:—

- |  |   |
|--|---|
| <ol style="list-style-type: none"><li>1. Check condition and tension of fan belts. Adjust as required, approx. 12mm deflection on longest span using moderate thumb pressure.</li><li>2. Power steering, check fluid level, top-up as required.</li><li>3. Batteries, check level of electrolyte, top-up if necessary, examine terminals for cleanliness and security. Check for leaks and security, clean outside of batteries if required.</li><li>4. Check radiator external condition for restriction, clean if required.</li><li>5. If operating in dusty conditions, remove air cleaner lower pan and clean.</li><li>6. Check operation of hand throttle control.</li><li>7. Check operation of power divider and transfer case lockout lights.</li><li>8. Check operation of transfer case controls.</li><li>9. Check condition of all wheel rims, tyres and valve stems.</li><li>10. Check wheelnuts are tight.</li><li>11. Check operation and security of spare wheel carrier.</li><li>12. Check security of fuel tank and air tanks as well as air lines.</li></ol> | <ol style="list-style-type: none"><li>13. Check security of crane.</li><li>14. Check air, fuel, oil and coolant systems for leaks.</li><li>15. Drain water from fuel tank. Loosen drain plug 2 to 3 turns and allow water to drain off, then retorque drain plug.</li></ol> |
|--|---|

## Table 4 Initial Servicing

<p>The following operations are to be performed by the driver under supervision:—</p> <ol style="list-style-type: none"> <li>1. Start and warm up engine.</li> <li>2. Stop engine, drain engine oil and refill.</li> <li>3. Remove and replace oil filters (3 off).</li> <li>4. Remove and replace water conditioner filter.</li> <li>5. Check and top-up power steering reservoir.</li> <li>6. Drain and refill front axle.</li> <li>7. Check oil level in front hubs.</li> <li>8. Drain and refill transmission.</li> <li>9. Drain and refill transfer case.</li> <li>10. Check oil level in crane reservoir.</li> <li>11. Drain and refill intermediate and rear axles.</li> <li>12. Lubricate front spring shackles (2 nipples).</li> <li>13. Lubricate steering box input shaft saltseal housing (1 nipple). Do NOT overgrease.</li> <li>14. Lubricate steering drag link (2 nipples).</li> <li>15. Lubricate steering shaft (3 nipples).</li> <li>16. Lubricate constant velocity joints (2 nipples).</li> <li>17. Lubricate front drive hub pivots (4 nipples).</li> </ol>	<ol style="list-style-type: none"> <li>18. Lubricate tie-rod ends (2 nipples).</li> <li>19. Lubricate transmission to transfer case propeller shaft (3 nipples).</li> <li>20. Lubricate transfer case to front differential propeller shaft (4 nipples).</li> <li>21. Lubricate clutch cross shaft (2 nipples). Do NOT overgrease.</li> <li>22. Lubricate clutch release bearing (1 nipple). Do NOT overgrease.</li> <li>23. Lubricate transfer case selector (1 nipple).</li> <li>24. Lubricate transfer case linkage support (1 nipple).</li> <li>25. Lubricate intermediate propeller shaft (3 nipples).</li> <li>26. Lubricate rear propeller shaft (3 nipples).</li> <li>27. Lubricate rear trunnion bushes (4 nipples).</li> <li>28. Lubricate pintle hook (4 nipples).</li> <li>29. Lubricate crane (10 nipples).</li> <li>30. Lubricate hook and pivots (crane)(oil can).</li> <li>31. Lubricate control handle pivots (crane)(smear grease).</li> <li>32. Lubricate sliding jib extension (crane)(oil can).</li> <li>33. Remove and replace oil filter (crane).</li> </ol>
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**Table 4****Initial Servicing (Cont'd)**

<p>34. Check crane for external oil leaks.</p> <p>35. Lubricate spare wheel carrier pivots (oil can).</p> <p>36. Lubricate water pump (1 nipple) until grease exudes from relief hole.</p> <p>37. Check battery electrolyte level (10 mm above plates) and security of terminals.</p> <p>38. Check all air, fuel and oil lines and unions for leaks.</p> <p>39. Re-torque all wheel nuts to correct specifications.</p> <p>40. Check tyres and wheels, inflate if necessary, inspect rims for damage, inspect tyres for uneven wear.</p> <p>41. Check operation of all lights, gauges and alarm systems. Check condition of all wire connections.</p> <p>42. Check torque of air inlet hose clamps and check condition of hoses.</p> <p>43. Check exhaust systems for leaks, damage and security.</p> <p>44. Check operation of clutch pedal. Check for correct free travel.</p> <p>45. Check park brake for application, holding ability and release.</p> <p>46. Slightly open air drain valves slowly, on all brake reservoirs.</p>	<p>The following operations are to be performed by a Qualified Vehicle Mechanic:—</p> <p>47. Check operation of crane.</p> <p>48. Check torque of front spring "U" bolts.</p> <p>49. Check torque of rear spring "U" bolts.</p> <p>50. Re-torque cylinder head bolts.</p> <p>51. Check and adjust valve clearances.</p> <p>52. Re-torque inlet and exhaust manifolds.</p> <p>53. Check and adjust fan belt tension. Re-torque alternator mounting bolts.</p> <p>54. Check torque of radiator mounting bolts, tighten as required.</p> <p>55. Tighten all propeller shaft coupling drive bolts.</p> <p>56. Check condition of governor seals.</p> <p>57. Replace primary and secondary fuel filters and bleed system.</p> <p>58. Road Test. Carry out a road test on steering and brake system. Note all faults and rectify as necessary.</p>
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## Table 5                      Minor Servicing

<p>The following operations are to be performed by the driver under supervision:—</p> <ol style="list-style-type: none"> <li>1. Start and warm up engine.</li> <li>2. Stop engine, drain engine oil and refill.</li> <li>3. Remove and replace oil filters (3 off)</li> <li>4. Check power steering reservoir, top-up if necessary.</li> <li>5. Remove and replace water conditioner filter.</li> <li>6. Check condition and alignment of engine cooling fan.</li> <li>7. Check engine vibration damper for damage or leaks.</li> <li>8. Check condition of engine mountings.</li> <li>9. Check engine hand throttle for connections and operation.</li> <li>10. Check operation of all engine alarm systems.</li> <li>11. Check all lights, gauges and alarm systems for correct operation, report defects.</li> <li>12. Check condition of radiator shroud and fins. Clean fins as necessary.</li> <li>13. Re-torque air inlet hose clamps and check condition of hoses.</li> <li>14. Re-torque radiator hose connections.</li> </ol>	<ol style="list-style-type: none"> <li>15. Check air starter for correct operation and lubrication. Starter exhaust should be oil moist.</li> <li>16. Check battery electrolyte level (10mm above plates) and security of terminals. Check batteries for cleanliness and security.</li> <li>17. Check for oil, fuel, coolant and air leaks. Report any defects.</li> <li>18. Check tyres and wheels, inflate if necessary, check rims, wheel nuts and tyres for uneven wear.</li> <li>19. Loosen fuel tank drain plug, 2 to 3 turns and allow water to drain off, retorque drain plug.</li> <li>20. Check air cleaners, remove lower pan, clean and refit. If indicator shows "red" replace elements.</li> <li>21. Check exhaust system for leaks, damage and security.</li> <li>22. Check front shock absorbers for leaks, damage and security.</li> <li>23. Inspect front and rear springs for damage, misalignment or broken leaves.</li> <li>24. Check oil level in front axle, top-up if necessary.</li> <li>25. Check oil level in front hubs, top-up if necessary.</li> <li>26. Check oil level in transmission, top-up if necessary.</li> <li>27. Check oil level in transfer case, top-up if necessary.</li> <li>28. Check oil level in crane reservoir.</li> </ol>
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**Table 6****Major Servicing (Cont'd)**

30. Remove and replace oil filter (crane).	46. Lubricate rear propeller shaft (3 nipples).
31. Drain and refill intermediate and rear axles.	47. Lubricate rear trunnion bushes (4 nipples).
32. Lubricate front spring shackles (2 nipples).	48. Lubricate pintle hook (4 nipples).
33. Lubricate steering box input shaft saltseal housing (1 nipple). Do NOT overgrease.	49. Lubricate mudguard hinge pivots (2 nipples).
34. Lubricate steering drag link (2 nipples).	50. Lubricate crane (10 nipples).
35. Lubricate steering shaft (3 nipples).	51. Lubricate hook and pivots (crane)(oil can).
36. Lubricate constant velocity joints (2 nipples).	52. Lubricate control handle pivots (crane)(oil can).
37. Lubricate front drive hub pivots (4 nipples).	53. Lubricate sliding jib extension (crane)(smear grease).
38. Lubricate tie-rod ends (2 nipples).	54. Check crane for external oil leaks.
39. Lubricate transmission to transfer case propeller shaft (3 nipples).	55. Lubricate spare wheel carrier pivots (oil can).
40. Lubricate transfer case to front differential propeller shaft (4 nipples).	56. Lubricate water pump (1 nipple) until grease exudes from relief hole.
41. Lubricate clutch cross shaft (2 nipples). Do NOT overgrease.	57. Check operation of all lights, gauges, and alarm systems. Check condition of all wire connections.
42. Lubricate clutch release bearing (1 nipple). Do NOT overgrease	58. Check park brake for application, holding ability and release.
43. Lubricate transfer case selector (1 nipple).	59. Carry out de-watering procedure on all brake reservoirs.
44. Lubricate transfer case linkage support (1 nipple).	60. Check operation of crane.
45. Lubricate intermediate propeller shaft (3 nipples).	

**Table 6 Major Servicing (Cont'd)**

<p>The following operations are to be performed by Qualified Vehicle Mechanic:—</p> <ol style="list-style-type: none"><li>61. Check fan belts, adjust as required.</li><li>62. Check and re-torque alternator mounting bolts.</li><li>63. Replace primary and secondary fuel filters and air bleed fuel system.</li><li>64. Check and re-torque radiator mountings.</li><li>65. Re-torque inlet and exhaust manifolds.</li><li>66. Check condition of governor seals.</li><li>67. Check condition of intercooler seals.</li><li>68. Check operation of engine brake, adjust where necessary.</li><li>69. Road test. Carry out brake and steering tests. Test all systems.</li><li>70. Record engine oil pressure at idle and full rpm.</li><li>71. Check operation of Puff Limiter.</li><li>72. Check service brake lining life.</li><li>73. Check front propeller shaft centre bearing for looseness.</li><li>74. Complete documentation.</li></ol>	
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## LUBRICATION

Engine	OMD-115
Transmission,	OEP-220(1)
Transfer case,	OEP-220(1)
Front axle	OEP-220(1)
Rear axles	OEP-220(1)
Front wheel bearings	OEP-220(1)
Power steering reservoir	OMD-115
Crane reservoir	OM-65
Chassis/crane lubrication	XG-274

(1) See EMEI VEH G 709 for list of approved lubricants

### Tyre pressure (cold)

Highway: front	625 kPa
intermediate	575 kPa
rear	575 kPa
Sand: front	525 kPa
intermediate	375 kPa
rear	375 kPa
Cross-country: front	625 kPa
intermediate	575 kPa
rear	575 kPa

# **CHAPTER THREE**

## **SECTION 2 LUBRICATION**

## LUBRICATION TABLE

Equipment	Lubricant	Capacity (litres)
Engine (including filters)	OMD-115	55.3
Transmission	OEP-220(1)	10.4
Transfer Case	OEP-220(1)	9.5
Rear Axle:		
Intermediate	OEP-220(1)	12.0
Rear	OEP-220(1)	11.2
Front Axle	OEP-220(1)	11.4
Power Steering	OMD-115	7.75
Front Wheel Bearings	OEP-220(1)	Fill to level plug (2)
Crane Reservoir	OM-65	75 (3)
Chassis Lubrication	XG-274	As required
Crane Lubrication	XG-274(3)	As required (3)
Sliding jib extension	XG-276(3)	As required (3)

Table 7 Lubrication requirements

- (1) See EMEI VEHICLE G709 for approved lubricants.
- (2) See EMEI VEHICLE G709 for draining and filling instructions.
- (3) See EMEI VEHICLE G719 for servicing instructions.

# LUBRICATION

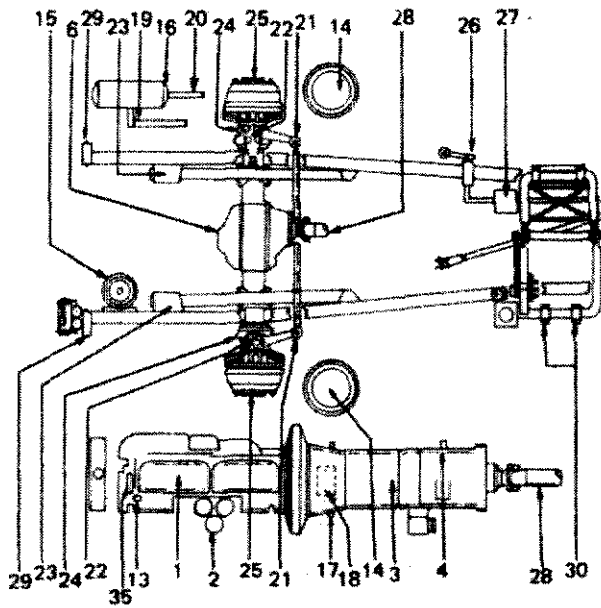


Fig. 28 Chassis and components identification (front section)

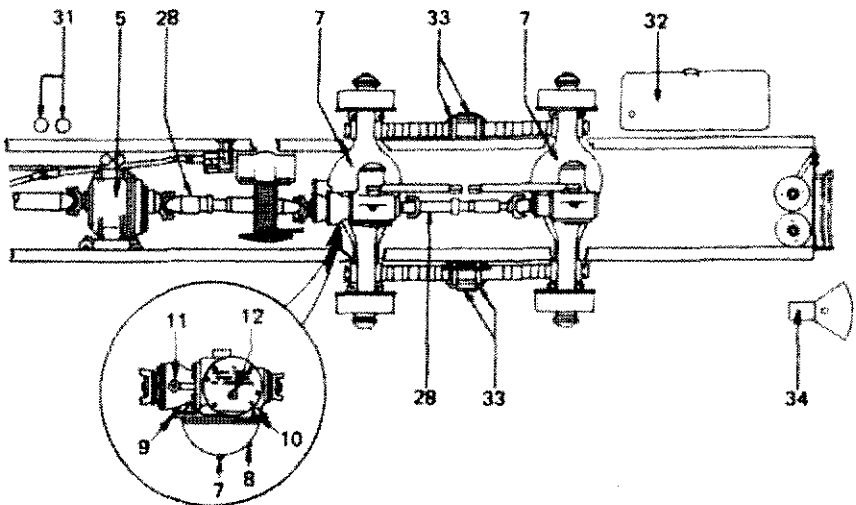


Fig. 29 Chassis and components identification (rear section)

# LUBRICATION

## Crankcase and oil filter change procedure (See fig. 28 item 1)

180. At oil change period, run engine until engine coolant reaches normal operating temperature. Shut down engine and drain crankcase before engine cools. Remove spin-on oil filters (item 2) using a filter clamp strap. Pre-fill each new full flow oil filter through the outer holes with 1.9 litres of OMD-115 engine oil. Take care to avoid any contaminants entering new filters while pre-filling. Install new filters as instructed on filter body. Fill crankcase with recommended oil and number of litres required. Run engine for about five minutes and check for leaks. Stop engine and recheck level; add make-up oil, if necessary, to correct level on dipstick (fig. 30).

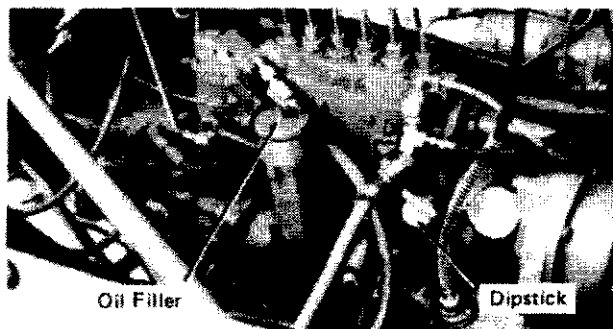


Fig. 30 Location of oil filler and dipstick

### NOTE

Do not overfill engine. Fill to correct level on dipstick.

When draining hot engine oil, take care, as the hot oil can scald. Drain the oil into a suitable container.

## Transmission (See fig 28 item 3)

181. The magnetic type drain plug is located directly under the transmission. A magnetic oil filter type plug is located on the right hand side of the main case. This plug should be cleaned every time the transmission oil is changed. Also, clean the trough inside and then re-install the magnetic plug.

182. The oil level plug is located on the right side toward the rear of the transmission (item 4)

183. The transmission breather is located on top of the transmission. This breather is connected via lines with transfer case and axles to a breather located on the firewall in the engine compartment.

### **Transfer case (See fig. 29 item 5)**

184. The drain plug is a magnetic type and is located in the lower part of the front section. This plug is to be removed and cleaned every time the transfer case oil is changed.

The oil level plug is located on the right hand side.

### **Front axle differential (See fig. 28 item 6)**

185. The drain plug is a magnetic type and is located in the lowest part of the housing. This plug is to be removed and cleaned every time the front differential oil is changed.

The oil level plug is located in the front part of housing. The upper (larger) plug is the correct level.

### **Rear axles (See fig. 29 item 7)**

186. The magnetic drain plugs are located in the lowest part of the housings, these are to be removed and cleaned every time the differential oils are changed (item 7).

187. The carrier oil level check plug is located to the rearward of each housing (item 8).

188. When changing oil in power divider (intermediate axle) and bevel gear housings (both axles), plugs (9) and (10), must be removed and cleaned. To refill power divider (intermediate axle only), plug (11) is used. To refill bevel gear housings (both axles), plug (12) is used. When refilling axle housings the correct procedure must be followed:—

- (a) Fill power divider (intermediate axle) through plug (11) and install fill plug.
- (b) Fill both bevel gear housings through plug (12) and install fill plugs.
- (c) Fill both axle housings through plugs (8) and install level plugs.

189. When checking oil level on axle housings, remove plug (8) only and check level, reinstall plugs.

190. Axle housing breathers are connected to transmission and transfer case breathers, via lines and piped to engine compartment.

### **Water conditioner (See fig. 28 item 13)**

191. A spin-on conditioner is located at the front of the engine, above the water pump. This filter is to be changed every service.

### **Air cleaners (See fig. 28 item 14)**

192. An air cleaner is mounted each side of the engine compartment. They are a dry type filter, with replaceable elements. The lower sections are to be removed and cleaned every service. The elements are not to be cleaned, or removed, unless the service indicator attached shows "red". When replacing elements, both are to be serviced.



### **Power steering (See fig. 28 item 15)**

193. The power steering reservoir is located in the left hand front corner of the engine compartment. This reservoir contains a replaceable filter and is to be replaced every Major Service.

194. The dry fill capacity of the system is 7.75 litres of OMD-115. When changing the power steering lubricant, it is recommended draining the system by removing the drain plug from the steering box. This operation is carried out with the wheels in a straight ahead position.

195. Replace filter and drain plug, top-up the system, and run engine and recheck level on dipstick (located in the top of the reservoir).

### **Steering box input shaft saltseal housing (See fig. 28 item 16)**

196. The saltseal is lubricated by a grease nipple at the rear of the power steering box. Lubrication is required every service but, DO NOT overgrease.

### **Clutch cross shaft (See fig. 28 item 17)**

197. The clutch cross shaft, located in the bell housing, forward of the transmission is lubricated by a grease nipple at each end of the shaft and is to be lubricated every service. DO NOT overgrease.

### **Clutch release bearing (See fig. 28 item 18)**

198. The clutch release bearing is located in the lower part of the bell housing. The one grease nipple is to be lubricated every service. DO NOT overgrease.

### **Drag link (See fig. 28 item 19)**

199. The drag link has two grease nipples and is lubricated every service.

### **Steering shaft (See fig. 28 item 20)**

200. The steering shaft has three grease nipples and is to be lubricated every service. Two grease fittings are located in the cab.

### **Tie-rod ends (See fig. 28 item 21)**

201. A ball joint is fitted either end of the steering tie-rod and is fitted with a grease nipple. These joints are to be lubricated every service.

### **Drive hub pivots (See fig. 28 item 22)**

202. There are upper and lower pivots each side of the axle. The four pivots are fitted with grease nipples and are to be lubricated every service.

#### **NOTE**

The front wheels must be raised to ensure proper lubrication.

### **Spring shackle pins (See fig. 28 item 23)**

203. Each front shackle pin is fitted with a grease nipple, and is to be lubricated every service.

### **Front axle constant velocity joints (See fig. 28 item 24)**

204. The front drive axle is fitted with a constant velocity universal joint at each end of the axle. These joints are fitted with a grease nipple and are to be lubricated every service.

### **Front wheel bearings (See fig. 28 item 25)**

205. These wheel bearings are oil-filled and are to be checked at the Minor service, and oil changed at the Major service.

- (a) To check oil level, remove the pipe plug. Rotate hub until pipe plug hole is in a horizontal position. Oil should be level with lower part of threaded hole.
- (b) To drain oil, with pipe plug removed, rotate hub until open threaded hole is in its lowest position, allow time for oil to drain off. Best results are obtained, when oil and hub are warm. To refill, with hub in horizontal position (threaded hole in horizontal position) fill to bottom of the threaded hole.
- (c) Replace pipe plug.
- (d) During checking at Minor service, should oil appear to be contaminated with water, oil should be changed at this service.

### **Transfer case selector (See fig. 28 item 26)**

206. The selector is fitted with a grease nipple and is to be lubricated every service.

### **Transfer case linkage support (See fig. 28 item 27)**

207. The support linkage is fitted with a grease nipple and is to be lubricated every service. This linkage is located on the right hand side, below the rear of the cab.

### **Propeller shafts (See fig. 28 and 29 item 28)**

208. The universal joints and sliding yokes are fitted with grease nipples and are to be lubricated every service.

- (a) The propeller shaft fitted between the transmission and transfer case is fitted with three nipples.
- (b) The propeller shaft fitted between the transfer case and front axle is fitted with four nipples. Also, there is a sealed centre bearing support for this shaft, with no lubrication required.
- (c) The propeller shaft fitted between the transfer case and intermediate axle is fitted with three nipples.
- (d) The propeller shaft fitted between the intermediate axle and rear axle is fitted with three nipples.

## NOTE

When greasing all joints ensure that grease escapes from all four bearing seals.

### **Mudguard hinges (See fig. 28 item 29)**

209. These mudguard hinges are to be lubricated with grease every Major service. These hinges are located at the front of chassis and are the pivot point when the mudguard section is tilted forward.

### **Water pump housing (See fig. 28 item 35)**

210. The water pump is lubricated by a grease nipple located on the upper edge of the housing and is lubricated every service.

### **Spare wheel carrier pivots (See fig. 28 item 30)**

211. The spare wheel carrier is located behind the cab and is hydraulic operated. The pivots points are to be lubricated with OMD-115, every service.

### **Fuel filters (See fig. 29 item 31)**

212. The vehicle is fitted with a primary and secondary fuel filter which are to be replaced every service. This operation must be carried out by a Vehicle Mechanic. At the same time, the fuel lines must be bled of all air. These filters are located on the right hand side of the chassis behind drivers' step. These filters differ from each other and can not be interchanged.

### **Fuel tank (See fig. 29 item 32)**

213. The fuel tank is located in the right hand rear corner of the chassis, behind the wheel. The tank is fitted with a drain plug. At each service, this plug is to be loosened two to three turns, to allow water to drain off, then retorque drain plug.

### **Trunnion bushes (See fig. 29 item 33)**

214. The trunnion bushes support the rear axle. There are two grease nipples either side.

### **Pintle hook (See fig. 29 item 34)**

215. The pintle hook located at the rear of the vehicle. There are four grease nipples fitted. Check is to be made on the locking pin slide.

### **Front and rear springs**

216. The 'U'-bolts of both front and rear springs are to be torqued at initial service only. When servicing, at all times, 'U'-bolts and plates are to be examined for movement or looseness. Report any evidence of movement.

## Crane Lubrication

217. At each service, inspect crane for external oil leaks and damage.

### Pivot pins and bushes (Fig. 31 item 1)

218. The pivot pins and bushes are fitted with grease nipples and are to be greased every service.

### Sliding jib extension (Fig. 31 item 2)

219. The sliding jib extension is to be cleaned and smeared with grease every service. See EMEI VEH G719 for approved lubricant.

### Hook and pivot (Fig. 31 item 3)

220. The hook and pivot is to be cleaned and reoiled every service.

### Mainpost bearings (Fig. 31 item 4)

221. There are two grease nipples fitted to the mainpost and are to be greased every service.

### Oil filter (Fig. 31 item 5)

222. The spin-on oil filter is to be replaced every service.

### Control handle pivots (Fig. 31 item 6)

223. These control handle pivots should be reoiled every service.

### Oil tank reservoir (Fig. 31 item 7)

224. The oil tank should be drained and refilled every major service. At the minor service, the oil level is to be checked and topped up if necessary.

Check table 7 for correct lubricant.

### Pivot point (Fig. 31 item 8)

225. This is to be greased every service.

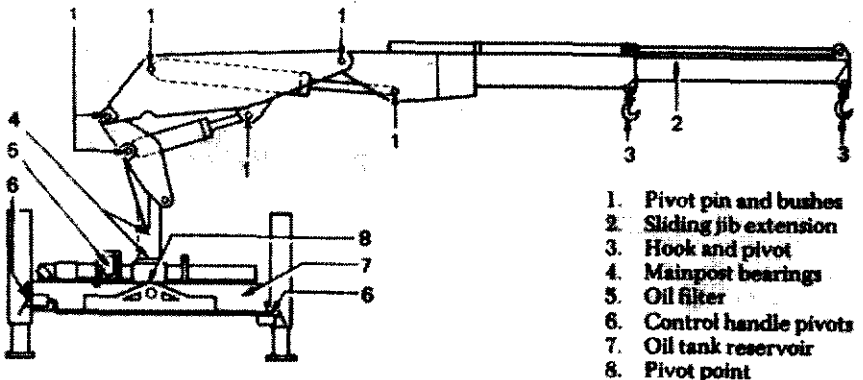


Fig. 31 Crane and components identification

**COMPLETE EQUIPMENT SCHEDULE (ISSUE 2)  
TRUCK CARGO HEAVY MC3  
LIABILITY CODE 76025**

Item	Stock No.	Description	Quantity	Remarks
1	7530-66-107-1001	BOOK — RECORD BOOK FOR SERVICE EQUIPMENT — COVER — WITH PARTS 1-4	1	AAB-140
2	7530-66-107-1002	BOOK — RECORD BOOK FOR SERVICE EQUIPMENT — INSERT — RECORD OF SERVICING	1	
3	7530-66-107-1016	BOOK — RECORD BOOK FOR SERVICE EQUIPMENT — INSERT — ENGINE HISTORY CARD — PART 5	1	
4		WHEEL RIM — PNEUMATIC TYRE, 8.00 x 20	1*	
5		TUBE — INNER, PNEUMATIC TYRE, 12.00 x 20	1*	
6		TYRE RADIAL, 12.00 x 20, 18 PLY RATING	1*	MILITAIRE PROFILE, TEXTILE RADIAL.
7		BOW, CANOPY, REMOVABLE X50RH49A	8*	
8		COVER, FITTED, VEHICULAR BODY TO MACK DRAWING X50RH456A	1*	CORESPUN POLYESTER COTTON TO SAMPLE 8305-0A-184-3
9	4210-66-031-1986	EXTINGUISHER, FIRE, VAPORISING LIQUID BCF, 1.5 KG	1*	DEF (AUST) 5921
10		BATTERY STORAGE, 12V 238 MM x 173 MM x 182 MM	2*	CRANKING RATING OF 210
11		JACK, HYDRAULIC, 20 TONNE, TO MACK DRAWING 9RCA112	1*	
12		WHEELBRACE, TYRE CHANGING, TO MACK DRAW- ING 11RC29	1*	

**COMPLETE EQUIPMENT SCHEDULE (ISSUE 2)  
TRUCK CARGO HEAVY MC3  
LIABILITY CODE 76025 (Cont.)**

Item	Stock No.	Description	Quantity	Remarks
13		HOSE, TYRE INFLATION/EMERGENCY START TO MACK DRAWING X50QEA335	1*	
14		BASEPLATE, METAL 380 MM x 12 MM WITH HANDLE, TO MACK DRAWING X50RC438	1*	
15	7240-99-802-2405	JERRICAN, FUEL 20 L TO DRAWING DSDC-0.0280	1	
16	7240-66-054-8602	JERRICAN, WATER 20 L TO DRAWING ADE(M)99-2	1	
17		CHAIN ASSY SINGLE LEG WITH HOOK, 1.5 M LONG, FOR 18 MM CHAIN SIZE FITTED WITH OBLONG LINK AND REMOVABLE JOINING LINKS	1	APPROXIMATE DIMENSIONS
18		SHACKLE, LARGE 'D', ALLOY STEEL, ZINC COATED, 35 MM DIA OF MATERIAL	1	
19	5120-66-012-6821	HANDLE, PICK	1*	
20	5120-66-012-6883	PICK, TO ADE(M) 302 AND ADE(M) 301	1*	
21	5110-66-011-0377	AXE, TO DEF(AUST) 802 AND 805	1*	
22	5120-66-093-8563	SHOVEL, TO ADE(M) 261	1*	
23	7610-66-115-4729	USER HANDBOOK, TRUCK, HEAVY, MC3, CARGO/CRAANE	1	

**COMPLETE EQUIPMENT SCHEDULE (ISSUE 2)  
TRUCK CARGO HEAVY MC3  
LIABILITY CODE 76025 (Cont.)**

Item	Stock No.	Description	Quantity	Remarks
24	2540-66-011-1999	CHAIN, WHEEL, TO FIT 1200 x 20 RADIAL TYRE	1 SET (2 CHAINS)	DRAWN "AS REQUIRED" FITTED TO FRONT WHEELS ONLY
25		NOTE: WHEEL CHAINS ARE TO BE PROVIDED ON AN "AS REQUIRED" BASIS FROM AN OPERATING POOL OF APPROXIMATELY 100 SETS. RECOVERY VEHICLE ONLY WILL HAVE OWN ISSUE. HANDLE — WHEEL WRENCH MACK 13RC14	1*	TO SUPPLEMENT WHEEL BRACE

\* SUPPLIED BY MANUFACTURER ON VEHICLE DELIVERY

## COMPLETE EQUIPMENT SCHEDULE ACCESSORY MAINTENANCE KIT (ISSUE 2)

Item	Stock No.	Description	Quantity	Remarks
1	5120-66-010-8484	HAMMER — ENGINEERS — 0.75 KG APPROX COM- PLETE WITH HANDLE	1	
2	5120-66-021-4760	SCREWDRIVER — FLAT TIP, 250 MM APPROX	1	
3	5120-66-026-0206	SCREWDRIVER — FLAT TIP, 150 MM APPROX	1	
4	5120-66-024-7832	SCREWDRIVER — PHILLIPS NO 3	1	
5		PLIERS — ORDINARY 150 MM APPROX	1	
6	5120-66-024-4349	PLIERS — SIDECUTTING 150 MM APPROX	1	
7	5120-66-013-7035	WRENCH — ADJUSTABLE 450 MM	1	
8	5120-66-013-6747	WRENCH — ADJUSTABLE 250 MM	1	
9		TORCH — DRY CELL BATTERY POWERED	1	
10	2640-00-050-1229	VALVE — TYRE TRI75A-F13	1	
11	5340-66-010-2790	PADLOCK — BRASS COMPLETE WITH KEYS 48 MM APPROX	2	SPARES
			2	FOR SECURING TOOL BOXES
12	4930-66-028-4061	GUN — GREASE HAND FORCE FEED 0.75 KG CAP INSERT — HEADLIGHT BULB HELLA XD2475/70	1	
13		LAMP — PARKING HELLA H242	1	SPARE
14		CAN, DISPENSING, FUNNEL TOP, TIN PLATE, 1 PINT CAPACITY, WITHOUT HANDLE	1	SPARE
15	7240-66-021-5710		1	





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