

**TRUCK, WRECKER, MEDIUM, MC2, MERCEDES BENZ UNIMOG U2450L  
SERVICING INSTRUCTION**

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

**TABLE OF CONTENTS**

	<b>Page No</b>		<b>Page No</b>
Introduction .....	3	Crane Re-certification .....	5
Associated Publications .....	3	POL Suitability .....	6
Action Required .....	4	Adjustments .....	6
Trade Requirements .....	4	Completion of the Service .....	8
Detail .....	4	Vehicle Cleaning .....	8
Vehicle Servicing and Crane Re-certification Intervals .....	4	Fluids and Lubricants .....	9
Servicing Sequence .....	5		

**LIST OF FIGURES**

	<b>Page No</b>		<b>Page No</b>
Figure 1 Power Train – Front .....	11	Figure 5 Recovery Equipment Servicing Points .....	31
Figure 2 Driveline/Cab/Chassis – Front .....	17	Figure 6 Winch .....	31
Figure 3 Driveline/Cab/Chassis – Rear .....	23	Figure 7 Folding Boom Assembly .....	31
Figure 4 Heating and Ventilation .....	27	Figure 8 Crane Servicing Points .....	55

**LIST OF TABLES**

	<b>Page No</b>		<b>Page No</b>
Table 1 Servicing Schedule .....	5	Table 7 Servicing Requirements for Driveline/Cab/Chassis – Rear .....	23
Table 2 Palfinger Crane Fasteners – Tightening Torques .....	8	Table 8 Servicing Requirements for Heating and Ventilation System .....	27
Table 3 Palfinger Crane Mounting Bolts – Tightening Torques .....	8	Table 9 Servicing Requirements for Recovery System .....	33
Table 4 Fluids and Lubricants .....	9	Table 10 Servicing Requirements for Crane .....	55
Table 5 Servicing Requirements for Power Train – Front .....	11		
Table 6 Servicing Requirements for Driveline/Cab/Chassis – Front .....	17		

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## INTRODUCTION

1. This EMEI lists the requirements for each level of servicing for the Truck, Wrecker, Medium, MC2, Mercedes-Benz Unimog U2450L.

### Associated Publications

2. Reference may be necessary to the latest issue of the following documents:

- a. [Defence Safety Manual \(SAFETYMAN\)](#);
- b. [EMEI Misc Equip O 008](#) – Lifting Tackle Components – Inspection Data;
- c. [EMEI Misc Equip O 420](#) – Pulling and Lifting Machines ‘Tirfor’ – Data Summary;
- d. [EMEI Misc Equip O 421](#) – Pulling and Lifting Machine ‘Tirfor’ – Operator Instructions;
- e. [EMEI Vehicle A 029](#) – Vehicles General – Servicing of B Vehicles, Trailers, Stationary Equipment, Auxiliary and Small Engines – Servicing Instruction;
- f. [EMEI Vehicle A 291-5](#) – Tyres and Tubes – General Service B Vehicles Tyre Guide – Operator Instructions;
- g. [EMEI Vehicle D 108](#) – Recovery Equipment – Inspection of Recovery Equipment – Inspection for Serviceability;
- h. [EMEI Vehicle D 393](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Light Grade Repair;
- i. [EMEI Vehicle D 394](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Medium Grade Repair;
- j. [EMEI Vehicle D 396-1](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Rope Brake Operator Instructions and Repair Manual;
- k. [EMEI Vehicle D 398-1](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Tow Adaptors and Recovery Return Anchor Points – Inspection for Useability;
- l. [EMEI Vehicle D 399-1](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Winch Constant Pull Check and Adjustment Procedure – Miscellaneous Instruction;
- m. [EMEI Vehicle D 399-2](#) – Truck, Wrecker, Medium, MC2, Mercedes Benz Unimog U2450L – Additional Inspection and Adjustment Procedures – Miscellaneous Instruction;
- n. [EMEI Workshop D 180](#) – Flaw Detection – Flaw Detection Non Destructive – General Instruction;
- o. EMEI Workshop E Series – Occupational Health and Safety Instructions;
- p. [EMEI Workshop H 108-1](#) – Cranes, Hoists and Winches – Inspection for Useability;
- q. [Material Safety Data Sheets \(MSDS\)](#);
- r. NSN 2320-66-145-3217 – Manual, Technical – Operator Handbook, Truck, Wrecker, Medium;
- s. NSN 7610-66-133-5220 – Manual, Technical – User Handbook for Single Channel Radio System Raven B Vehicle and Ground Installations;
- t. [Repair Parts Scale 02229](#) – Truck, Wrecker Medium, MC2, FFR, 6X6 DCAUP U2450L Diesel Engine, Manual Transmission W/Splitter, W/Twin Winch & Under Lift Boom System, Single Line Pull 8000 KG;
- u. Relevant equipment EMEI Servicing Instructions; and
- v. [Technical Regulation of Army Materiel Manual \(TRAMM\)](#) Volume 2, Section 4, Chapter 4, Inspection and Classification of Land Materiel.

## Action Required

### WARNING

All industrial safety, work practices and equipment operating and maintenance instructions pertaining to this EMEI are to be adhered to.

The handling, storage and use of chemical substances are to be in accordance with SAFETYMAN, MSDS and EMEI Workshop E series requirements.

Tradespersons are to be aware that parts of this procedure are carried out at heights above two metres. They are to ensure that they are securely positioned on stable platforms to negate the chance of a fall when carrying out tasks. Failure to comply may result in injury or death.

When operating on the recovery platform tradespersons are to ensure that the rear stowage cabinet doors are closed. Failure to comply may result in injury or death.

3. All procedures and adjustments detailed in this EMEI are to be performed by technical maintenance organisations authorised to carry out Light, Medium or Heavy Grade Repairs.

## Trade Requirements

4. All procedures and adjustments are to be carried out by Defence tradespersons or civilian equivalent as follows:

- a. Vehicle Mechanic (ECN 229 Sub 4 Corporal qualified);
- b. Metal Smith (ECN 235) and Fitter Armament (ECN 146); and
- c. Recovery Mechanic (ECN 226) to assist with operation and preparation of MRV where required.

5. **Air-Conditioning.** Repairs and servicing to the air conditioning system are to be carried out by:

- a. ECN 418 Technician Electrical; or
- b. Civilian equivalent qualified in air-conditioning repairs.

6. **Standard Job.** MMM standard job numbers have been raised to carry out and record vehicle servicing. The following standard job numbers have been allocated:

- a. Minor Service – SJ007.
- b. Major Service – SJ016.
- c. Alt/Major Service – SJ031.

7. The standard job numbers are correct at time of publishing. Confirm numbers are correct after 12 months.

## DETAIL

### Vehicle Servicing and Crane Re-certification Intervals

#### NOTE

Instructions for servicing B Vehicles in EMEI Vehicle A 029, Table 1, are not to be used for servicing the Truck, Wrecker, Medium, MC2 Mercedes-Benz Unimog U2450L.

8. All servicing for the Medium Recovery Vehicle (MRV) is detailed in this instruction. The following tables provide the servicing requirements for the MRV:

- a. Table 1 details the servicing schedule for the MRV.
- b. Tables 2 and 3 detail the torque settings for fasteners and mounting bolts on the Palfinger crane.
- c. Table 4 lists the fluids and lubricants used on the MRV.
- d. Tables 5 to 10 detail the MRV servicing requirement for each level of servicing.

**Table 1 Servicing Schedule**

Type of Service	Period/Limits
Initial	750 km or one month, whichever occurs first
Minor	Every 10 000 km or 12 months, whichever occurs first
Major	Every 20 000 km or 12 months, whichever occurs first
Alternate major	Every 40 000 km or 24 months, whichever occurs first
Crane re-certification	At 10 years and thereafter every 5 years of service, in accordance with AS 1418.11 and AS 2550.11

**Servicing Sequence**

9. The following servicing sequence is to be applied to the MRV:
- a. Initial service – 750 km or one month from introduction into service or as per warranty agreement.
  - b. Minor service – 10 000 km or 12 months from introduction into service.
  - c. Major service – 10 000 km or 12 months from last minor service.
  - d. Minor service – 10 000 km or 12 months from last major service.
  - e. Alternate major service – 10 000 km or 12 months after the second minor service has been carried out.
  - f. The servicing sequence commences again after the alternate major service, with a minor service being carried out after a further 10 000 km or 12 months.
10. Servicing is to be based on distance travelled after the warranty period is completed, with all vehicles being serviced and technically inspected at least once every 12 months. Unit commanders may reduce the period between services or add servicing tasks to meet operational or exercise requirements. A scheduled service may be anticipated or delayed within a limit of plus or minus 10 per cent of the interval between services to meet operational needs and to permit workload planning.

**NOTE**

When any equipment exceeds the 10 per cent maximum limit of the servicing interval (Table 1), it is to be classified '**XX – Do Not Use**' until the outstanding service is completed.

**Crane Re-certification**

11. The process for re-certification of the crane is as follows:
- a. Check the vehicle GM 120 log book for the date of introduction into service and for any past re-certification of the crane at service intervals indicated in Table 1.
  - b. If the crane life is at the time frame for re-certification as indicated in Table 1, the following is to be implemented:
    - (1) the user unit is to submit a maintenance request via their supporting Joint Logistic Unit (JLU) for re-certification of the MRV crane; and

**NOTE**

The supporting JLU is to indicate to the dealership the time frame period of re-certification (Table 1) and that the certification is to be in accordance with AS 1418.11 and AS 2550.11.

- (2) the JLU is to liaise with the prime original equipment manufacturer, Mercedes-Benz Australia, dealership for re-certification of the Palfinger crane at an authorised repair agent.
- c. On completion of re-certification of the crane, the supporting JLU is to ensure that the following actions have been completed:
  - (1) a certificate of re-certification from the authorised repair agent has been placed in the vehicle GM 120 log book;
  - (2) the re-certification process has been detailed in Part 4 of the vehicle GM 120 log book; and

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- (3) that an out-inspection of the vehicle crane is conducted at the re-certification repair agent prior to delivery of the MRV back to the user unit.

**POL Suitability**

- 12. Shell Retinax LX2 is an EP lithium complex grease and only EP lithium complex greases are to be used where Shell Retinax LX2 is specified.
- 13. Where MoS2 greases are specified, only alternative greases containing MoS2 may be used.
- 14. Castrol Syntrans 75W/85 is a synthetic manual transmission fluid and is the only oil approved by the vehicle manufacturer for use in the transmission and splitter gearbox.

**Adjustments**

15. During the servicing process, there is a requirement to carry out adjustments and measurements. This paragraph provides the common component tensions and measurements to ensure the MRV’s functionality:

- a. Air compressor cylinder head bolts ..... 27 to 30 N.m
- b. Air conditioner compressor mounts ..... 75 N.m
- c. Air conditioner compressor mounting bolts ..... 33 N.m
- d. Engine idle.....700 rpm
- e. Recovery system operating rpm (high idle).....1500 rpm
- f. Engine maximum rpm .....3000 rpm
- g. Valve clearances (cold):
  - (1) Inlet .....0.40 mm
  - (2) Exhaust.....0.60 mm
- h. Exhaust manifold bolts ..... 50 N.m
- i. Drive belts adjustment..... between 5 and 10 mm (dependant on the length of the belt)
- j. Alternator mounting bolts:
  - (1) Alternator to bracket ..... 40 N.m
  - (2) Alternator to crankcase ..... 40 N.m
  - (3) Clamping bolt to alternator ..... 51 N.m
- k. Engine mounting bolts (front and rear to frame (M14 – 10.9))..... 140 ± 20 N.m
- l. Steering box mounting bolts.....420 N.m
- m. Transmission mounting bolts:
  - (1) Transmission bearing bracket, left and right-hand to chassis (M36 x 1.5 x 24)..... 180 N.m
  - (2) Left transmission bearing to bracket (M16 x 1.5 x 65 (12.9))..... 340 N.m
  - (3) Right-hand transmission bearing to bracket (M12 x 1.5 x 112 (12.9)) ..... 150 N.m
  - (4) Left and right-hand transmission bearing to transmission housing ..... 145 N.m
- n. Six-wheel work brake operating air pressure ..... 5.6 to 5.8 bar
- o. Brake pad minimal thickness:
  - (1) Front.....2.0 mm
  - (2) Rear .....2.0 mm
- p. Brake disc minimal thickness .....26 mm
- q. Front and rear transverse link mounting bolts (M16 x 1.5 (10.9))..... 315 N.m
- r. Stabiliser bar mounting bolts (bracket to chassis) (M14 x 1.5) ..... 150 N.m
- s. Torque tube strut securing bolts (axle to torque tube) (M18 x 1.5) ..... 350 N.m

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<b>t.</b>	Rear longitudinal link mounting bolts.....	150 N.m
<b>u.</b>	Cabin dampener mounting bolts:	
	<b>(1)</b> Front (M14).....	120 N.m
	<b>(2)</b> Rear (M10).....	45 N.m
<b>v.</b>	Wheel nuts.....	400 N.m
<b>w.</b>	Spare wheel securing bolt .....	50 N.m
<b>x.</b>	Central Tyre Inflation System (CTIS):	
	<b>(1)</b> Maximum pressure.....	6.0 to 6.5 bar
	<b>(2)</b> Minimum pressure .....	0.5 bar
<b>y.</b>	Hydraulic oil system cooling fan activating temperature.....	60°C
<b>z.</b>	Winch mounting bolts:	
	<b>(1)</b> Zinc plated bolts.....	119 N.m
	<b>(2)</b> Black coloured bolts .....	135 N.m
<b>aa.</b>	Winch cut-out.....	7.5 to 8.0 tonne (73.5 to 78.4 kN)
<b>bb.</b>	Winch rope brake swing stop-screw end protrusion .....	16.0 mm
<b>cc.</b>	Winch drum brake shoe (drag brake) wear limit.....	2.0 mm
<b>dd.</b>	Winch free spool cylinder locking pin maximum protrusion (engaged).....	5.0 mm
<b>ee.</b>	Folding boom to main boom clearance .....	0.5 mm each side
<b>ff.</b>	Main boom wear plates (quadrant) minimum clearance to retaining screw surface .....	0.5 mm
<b>gg.</b>	Main boom to folding boom wear strips minimum clearance to retaining screw surface .....	0.5 mm
<b>hh.</b>	Folding boom to extension boom internal wear pads minimum protrusion .....	2.0 mm
<b>ii.</b>	Recovery platform mounting bolts:	
	<b>(1)</b> M14 bolts .....	189 N.m
	<b>(2)</b> M24 bolts .....	250 N.m
<b>jj.</b>	Fairlead guide-wear insert retaining bolts .....	9 N.m
<b>kk.</b>	T-bar maximum radial movement:	
	<b>(1)</b> Yoke to extension boom .....	1.5 mm
	<b>(2)</b> T-bar to yoke.....	1.5 mm
<b>ll.</b>	T-bar to yoke maximum end float.....	2.0 mm
<b>mm.</b>	Yoke to extension boom maximum end float.....	2.0 mm
<b>nn.</b>	Yoke extension boom shaft to extension boom bush tolerances:	
	<b>(1)</b> Yoke extension boom shaft – minimum diameter of shaft .....	88.45 mm
	<b>(2)</b> Extension boom bush (for fitting of yoke) – maximum inside diameter.....	91.5 mm
	<b>(3)</b> Maximum allowable lateral clearance between yoke extension boom shaft and extension boom bush.....	1.5 mm
<b>oo.</b>	T-bar pivot pads (bump stop pads) minimum pad depth to retaining bolt surface.....	2.0 mm
<b>pp.</b>	Extension boom to yoke bronze thrust washer – grease grooves minimum depth.....	0.2 mm
<b>qq.</b>	Spade leg housing wear pads (minimum protrusion).....	0.5 mm
<b>rr.</b>	Crane pressure filter bowl tension.....	20 N.m
<b>ss.</b>	Recovery pressure filter bowls tension .....	20 N.m

- tt. Engine oil filter bowl tension ..... 40 to 45 N.m
- uu. Palfinger crane fasteners and mounting bolts ..... Tables 2 and 3

16. The ISO standards apply to the fasteners used on the Palfinger crane: bolts 4014 and 4672, nuts 4032 and washers 7090. The torque figures detailed in Tables 2 and 3 apply to fasteners with clean, lightly oiled threads.

**Table 2 Palfinger Crane Fasteners – Tightening Torques**

Crane Fasteners Tightening Torques N.m		
Thread Diameter	Property Class (Grade)	
	8.8	10.9
M8	23	34
M10	46	68
M12	79	117
M14	125	185
M16	195	280
M18	280	390
M20	390	560

**Table 3 Palfinger Crane Mounting Bolts – Tightening Torques**

Crane Mounting Bolts Tightening Torques N.m	
Thread Diameter	Property Class (Grade) – 8.8
M16 x 1.5	105
Thread Diameter	Screw Material: 42 Cr Mo 4v
M24 x 1.5	600
M30 x 1.5	1200

**Completion of the Service**

- 17. At the completion of each service, carry out the following:
  - a. a functional test of the recovery system,
  - b. a functional test of the crane,
  - c. inspect all lights and instruments, and
  - d. road test the vehicle.

**Vehicle Cleaning**

- 18. Prior to carrying out any servicing and maintenance procedure, there may be a requirement to clean components of the vehicle. The MRV consists of sensitive electrical, mechanical and pneumatic components that are prone to damage if care is not taken when cleaning, in particular high pressure cleaning.
- 19. When cleaning the vehicle (if required) in preparation for any servicing and maintenance procedures, the following must be observed:

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**The ingress of water into components causes rust and lubricant contamination which may result in the premature failure of equipment.**

**Cabinet seals and latches will not seal against a direct water jet blast.**

**The ingress of water into the hydraulic oil tank, the directional control valves (including the crane controls) or the winch drums adjacent to the right side main seal will lead to equipment failure.**

- a. High-pressure water jet blasts must not be directed at the top of the hydraulic oil tank, the hydraulic directional control valves (including crane controls) and the winch drums adjacent to the right-hand side main seal.
- b. Use pH neutral, biodegradable cleaning agents to avoid damage to chrome parts.
- c. When cleaning the crane and recovery equipment with a high-pressure cleaning device, the temperature of the cleaning agent must not exceed 60°C.
- d. Protect the polytetrafluoroethylene (PTFE) diaphragm on the speed limiter actuator (situated under the gearshift control panel) against high-pressure water jet.
- e. After high-pressure water cleaning, all lubrication points on the recovery system are to be serviced to expel water from bushes, bearings and seals.

**Fluids and Lubricants**

**20.** Fluids and lubricants used when servicing the MRV are detailed in Table 4.

**Table 4 Fluids and Lubricants**

Component	Model	Qty	Commercial Lubricant	Lubricant to DEF(AUST)206
Fuel system	OM 366LA	302 L	Diesel fuel	Diesel fuel auto
Cooling system (including inhibitor) (50% coolant/water mix)		20 L	Castrol Antifreeze DB, BP coolant 007/400F or equivalent	
Engine crankcase (including filter)		14.5 L	Engine oil SAE 40	OMD-115
Main transmission (including transfer case and working gear group)	UG 3/40-8/13.01	12 L	Castrol Syntrans 75W/85	
Splitter transmission	Werner	2.8 L	Castrol Syntrans 75W/85	
Inter-axle drive (Power Divider)		3.5 L	Hypoid Trans Oil SAE 90	OEP-220
Front axle	MB 737.207	2.5 L	Hypoid Trans Oil SAE 90	OEP-220
Intermediate axle	MB 747.470	2.5 L	Hypoid Trans Oil SAE 90	OEP-220
Rear axle	MB 747.480	2.5 L	Hypoid Trans Oil SAE 90	OEP-220
All wheel hubs		0.25 L	Hypoid Trans Oil SAE 90	OEP-220
Power steering	LS6 765.863	3.2 L	Steering gear oil SAE 10W	OX-47 Grade 10
Clutch system		0.2 L	Brake fluid DOT 4	OX(AUST)-8
Brake system		1.0 L	Brake fluid DOT 4	OX(AUST)-8
Grease nipples		As required	Multipurpose grease (Shell Retinax LX2 or equivalent)	XG-291

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Table 4 Fluids and Lubricants (Continued)

Component	Model	Qty	Commercial Lubricant	Lubricant to DEF(AUST)206
Hydraulic tank (common) 5°C to 42°C (max oil temp 80°C) OR -6° to +25°C (max oil temp 60°C)		135 L	Shell Tellus 68	Hydraulic fluid, petroleum, anti-wear Grade 68  Hydraulic fluid, petroleum, anti-wear H-576 (OM-33)
Winch rope		900 g	Rocol wire rope spray	
Winch rope brake		As required	Engine oil SAE 40 Shell Retinax LX2 multipurpose grease	OMD-115 XG-291
Winch free spool cylinder		30 g	Rubber grease	XG-315
Main boom locking quadrant wear strips		30 g	Molybond 122L dry film lubricant	Lubricant, dry film molybdenum disulphide NSN 9150-66-089-5365 NSN 9150-66-017-9404
Battery posts/terminals		As required	PX7 (DEF STAN 91-38, petroleum jelly)	PX7
General components MRV		As required	WD40 or equivalent	
Screw thread anti-seize compound		As required	As applicable	As applicable
Winch V-seal		As required	Molykote 111	
Air-conditioner gas		2 kg	R134a	
Air-conditioner oil, refrigerant compressor		220 ml	Ester Grade RL68	

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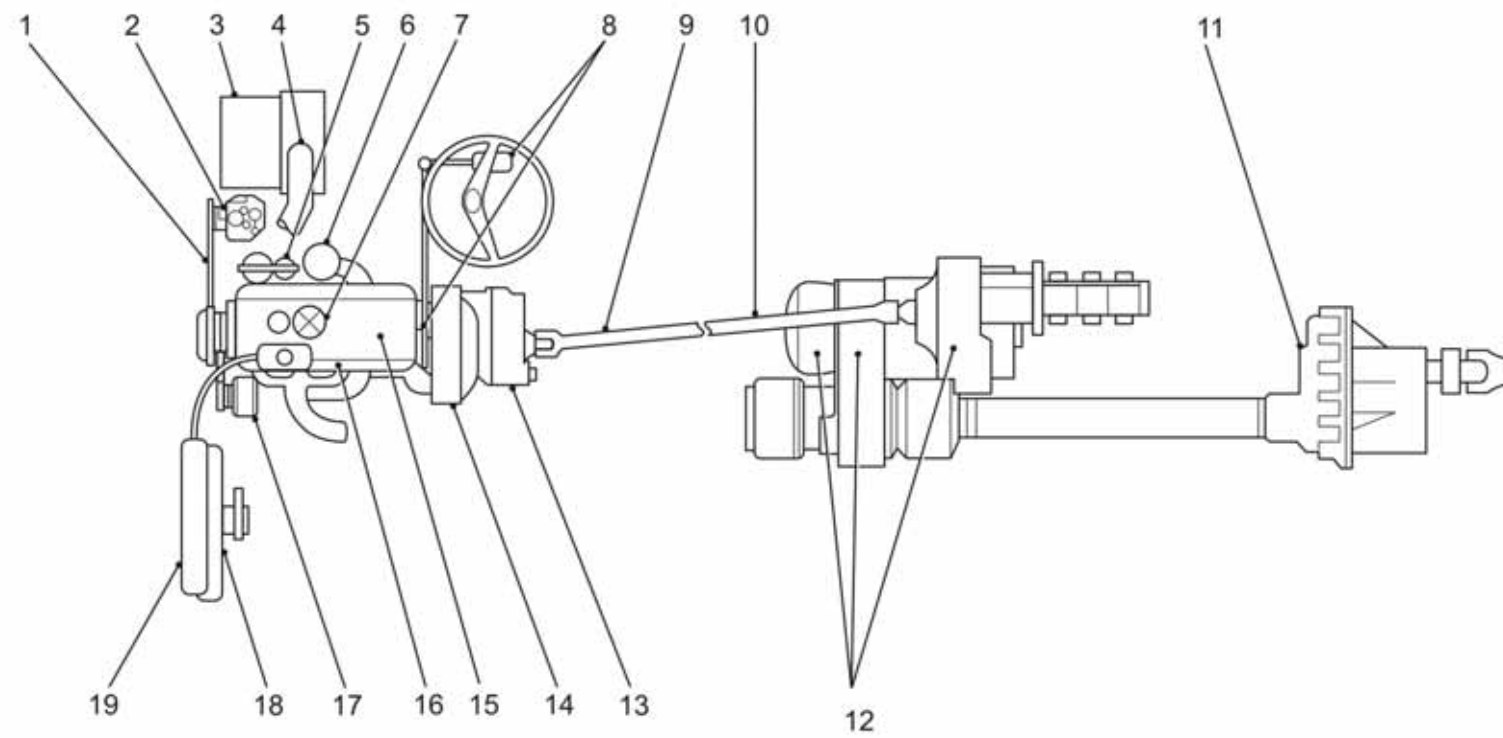


Figure 1 Power Train – Front

Table 5 Servicing Requirements for Power Train – Front

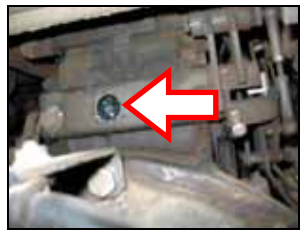
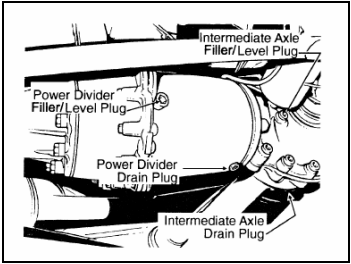
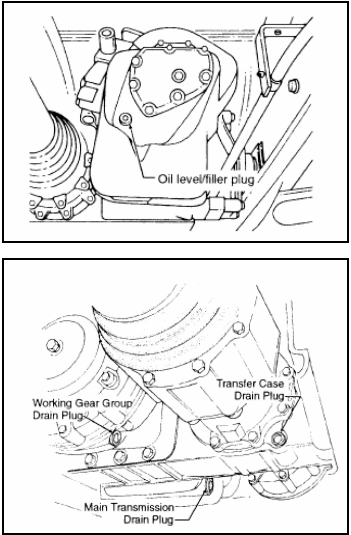
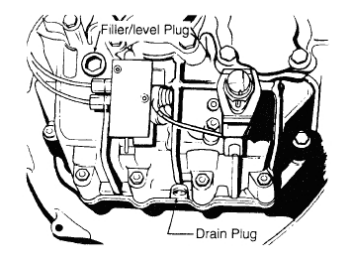
Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Drive belts (Note 2)	I	I	I			Figure 1 Item 1	5
2	Air compressor (Notes 3 and 4)	I	I	I			Figure 1 Item 2	1
3	Air cleaner element (Note 5)	C, I	C, I	R			Figure 1 Item 3	1
4	Air intake system (Note 6)	I, T	I, T	I, T			Figure 1 Item 4	1
5	Fuel system and filters (Notes 4, 7 and 8)	I	I, R	I, R			Figure 1 Item 5	2
6	Engine oil filter	N/A	R	R			Figure 1 Item 6	1
7	Engine breather (Note 9)	I, C	I, C	I, C			Figure 1 Item 7	1
8	Throttle linkage (Note 10)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 1 Item 8 	1
9	Propeller shaft (engine to flexible coupling) (Note 11)	I, T	I, T	I, T			Figure 1 Item 9	4
10	Propeller shaft (flexible coupling to transmission) (Note 11)	I, T	I, T	I, T			Figure 1 Item 10	8

Table 5  
Fig 1

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Table 5 Servicing Requirements for Power Train – Front (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
11	Power divider (Note 12)	U	E	E	OEP-220	3.5	Figure 1 Item 11 	1
12	Transmission, working gear and T-case (Notes 12 and 13)	U	E, I, C, T	E, I, C, T	Castrol Syntrans 75W/85	12	Figure 1 Item 12 	3
13	Splitter transmission (Note 12)	U	E, I, C	E, I, C	Castrol Syntrans 75W/85	2.8	Figure 1 Item 13 	1
14	Clutch system (Notes 4, 12 and 14)	I, U	I, E	I, E	OX(AUST)-8	0.2	Figure 1 Item 14	1
15	Engine oil (with filter) (Note 12)	U	E	E	OMD-115	14.5	Figure 1 Item 15	1
16	Exhaust manifold (Notes 15 and 16)	I	I, T	I, T			Figure 1 Item 16	1
17	Alternator mounting bolts	I, T	I, T	I, T			Figure 1 Item 17	1
18	Viscous fan (Note 17)	I	I	I			Figure 1 Item 18	1
19	Cooling system (Notes 4, 18 and 19)	I, U	I, E	I, E	Castrol Antifreeze DB (50/50 mix with water)	20	Figure 1 Item 19	1
20	Engine valves(Note 20)	N/A	A	A			EME1 Vehicle D 399-2	
21	Engine mounting bolts	I	I, T	I, T				9
22	Engine (Note 19)	I	I	I				1

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**Table 5 Servicing Requirements for Power Train – Front (Continued)**

<p><b>Legend:</b> A – Adjust, C – Clean, E – Evacuate/Drain and Refill, I – Inspect and/or Correct, L – Lubricate, R – Replace, T – Tighten/Free Up, U – Check and Top Up, N/A – No Action</p>	
<p><b>Notes:</b></p>	
1	Table 5, Servicing Requirements for Power Train – Front, refers to Figure 1, Power Train – Front.
2	Rotate the drive belt pulleys and check for smooth operation. Inspect the belts and pulleys for damage and cracks. Check the tension of all belts in accordance with EMEI Vehicle D 393.
3	Inspect the air compressor mounting bolts for security.
4	Check all pipes, hoses and lines for chafing, leaks and security of connections.
5	Replace the air cleaner element after it has been cleaned five times or at every alternate major service, whichever occurs first. Washing the air cleaner element is not permitted; blow clean the air cleaner element with compressed air.
6	Inspect and tighten all air-intake and intercooler clamps. Inspect all hoses and pipes for cracks, chafing and leaks and check security of all connections. Inspect the intercooler for cracks, damage and blockages in the cooling fins. Inspect the cold start plastic lines for damage.
7	Drain a sample of fuel from the fuel tank via the fuel tank drain. Replace the fuel tank drain plug sealing washer. If water is detected in the fuel, both the pre-filter element and the main fuel filter element are to be replaced and fuel drained from the tank until no more water is detected.
8	Replace the fuel filter element and pre-filter element at every major and alternate major service.
9	If the engine breather is suspected of being blocked, test in accordance with EMEI Vehicle D 393.
10	Grease the throttle cross shaft. Remove the accelerator pedal shaft cover and remove all foreign matter. The grease nipple is located underneath the cab at the rear of the engine. Access to the grease nipple can be via the MRV driver's side wheel-well with the front wheels at full left lock.
11	Apply Loctite 243 to the threads of any loose securing bolts and torque to 75 N.m.
12	During evacuate, drain and refill servicing procedures, clean/inspect drain plugs and washers, replace if necessary.
13	Re-torque the transmission mounting bolts at every major and alternate major service. Remove all three drain plugs to ensure the system is fully drained.
14	Remove the clutch housing drain plug. If any hydraulic fluid drains from the clutch housing, it is possible the clutch hydraulic circuit is leaking through the clutch central operator and slave cylinder in the splitter transmission.
15	Inspect the turbocharger and exhaust brake manifold for leaks.
16	Torque the exhaust manifold bolts at every major and alternate major service.
17	Rotate the viscous fan by hand to ensure residual drag is present. Inspect the fan viscous coupling control spring for cleanliness, clean if required.
18	Clean and inspect between the radiator and intercooler for leaks and cracks.
19	Run the engine and check for any fuel, oil and coolant leaks.
20	Carry out engine valve adjustment in accordance with EMEI Vehicle D 399-2.

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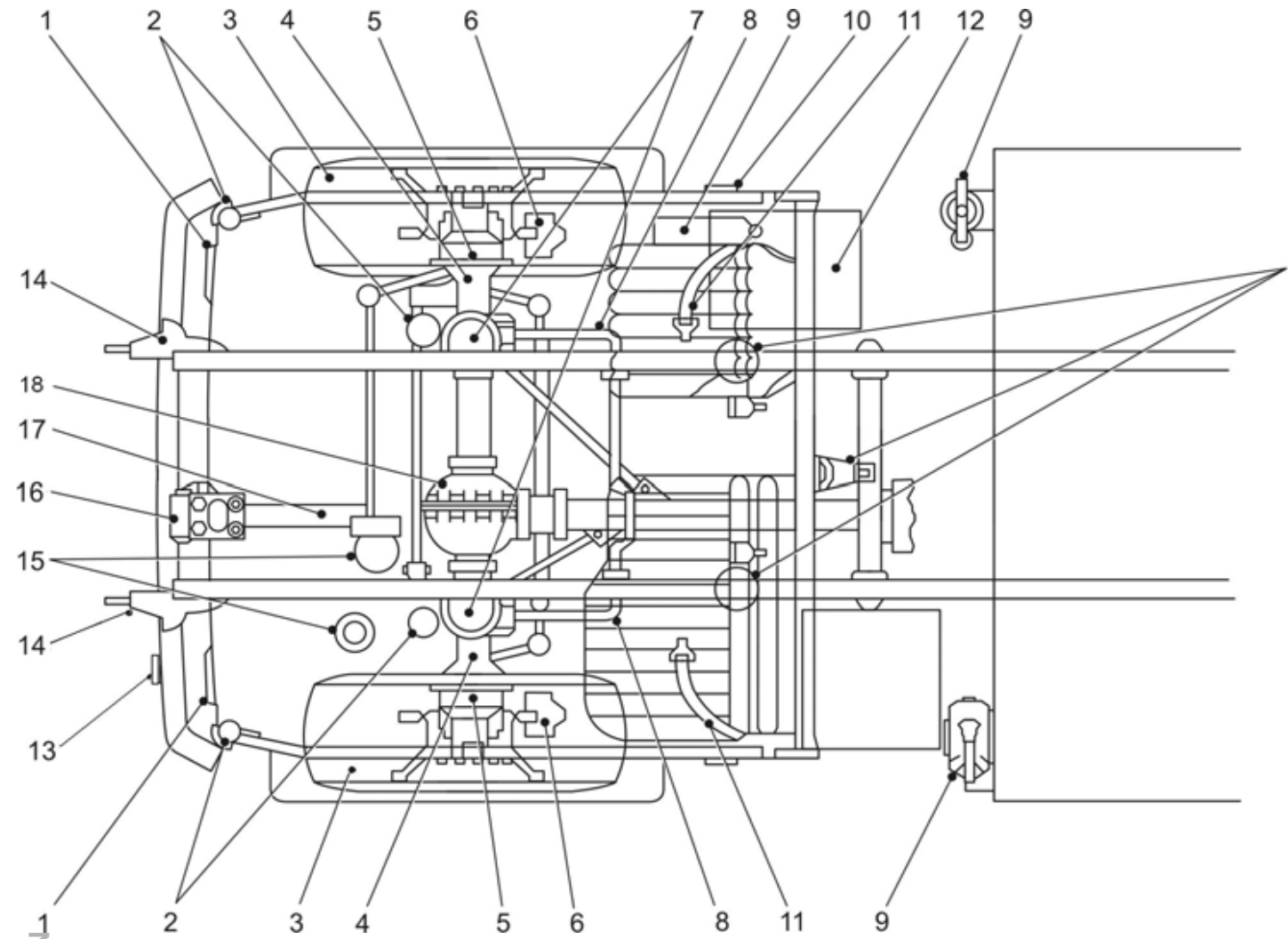



Figure 2 Driveline/Cab/Chassis – Front

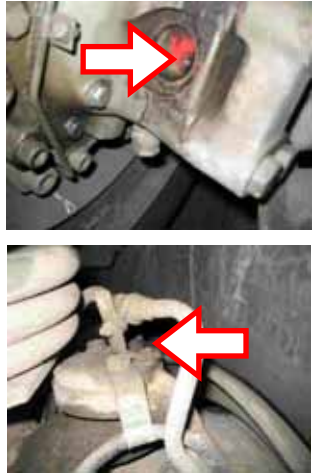
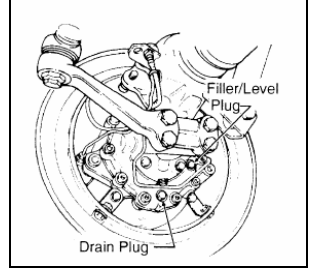

Table 6 Servicing Requirements for Driveline/Cab/Chassis – Front

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Front lights (Note 2)	I	I	I			Figure 2 Item 1 	8
2	Cabin mounts and dampers	I, T	I, T	I, T			Figure 2 Item 2	7
3	Wheels, tyres and CTIS (Notes 3 and 4)	I, T	I, T	I, T			Figure 2 Item 3 EMEI Vehicle D 399-2	2

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Table 6 Servicing Requirements for Driveline/Cab/Chassis – Front (Continued)



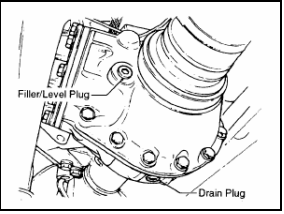
Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
4	Steering knuckle bearing (lower and upper lubrication points)	L	L	L	Shell Retinax LX2		Figure 2 Item 4 	4
5	Front wheel hub drive (Note 5)	U	E	E	OEP-220	0.6	Figure 2 Item 5 	2
6	Front brakes (Notes 6, 7, 8, 9 and 10)	I, T, E	I, T, E	I, T, E			Figure 2 Item 6	2
7	Front suspension	I	I	I			Figure 2 Item 7	2
8	Stabiliser bar mounting (Note 11)	I, T	I, T	I, T			Figure 2 Item 8	4
9	Fire extinguishers	I	I	I			Figure 2 Item 9	3
10	Cabin doors, locks, hinges and mirror (Note 12)	I, L	I, L	I, L			Figure 2 Item 10	2
11	Seat belts	I	I	I			Figure 2 Item 11	2
12	Batteries (Note 13)	C, I, L	C, I, L	C, I, L	PX-7		Figure 2 Item 12	2
13	Engine bay access step (Note 14)	I	I	I			Figure 2 Item 13 	1
14	Front lifting/recovery and tie-down points (Note 15)	I	I	I			Figure 2 Item 14 EMEI Vehicle D 398-1	2

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Table 6 Servicing Requirements for Driveline/Cab/Chassis – Front (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
15	Steering system (Notes 16, 17 and 18)	I, U	I, U, T	I, T, E, R	OX-47 Grade 10	3.2	Figure 2 Item 15 	1
16	Front winch rope guide rollers (Note 19)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 2 Item 16 	4
17	Front winch rope guide tube	C, I	C, I	C, I			Figure 2 Item 17	1
18	Front axle differential (Note 5)	U	E	E	OEP-220	2.5	Figure 2 Item 18 	1

**Legend:** A – Adjust, C – Clean, E – Evacuate/Drain and Refill, I – Inspect and/or Correct, L – Lubricate, R – Replace, T – Tighten/Free Up, U – Check and Top Up

**Notes:**

- 1 Table 6, Servicing Requirements for Driveline/Cab/Chassis – Front, refers to Figure 2, Driveline/Cab/Chassis – Front.
- 2 Functionally test the tilt control of the headlights by manually operating the control knob inside the cabin.
- 3 Check the condition of the tyres; rotate the wheels in accordance with the Technical Manual Operator Handbook (Para 2.r) and ensure the wheel nuts are re-torqued after 50 km.
- 4 Check the CTIS system for maximum pressure in accordance with EMEI Vehicle D 399-2. This procedure checks/adjusts the setting of the CTIS system maximum pressure for all three axles (front and rear).
- 5 During evacuate, drain and refill servicing procedures, clean/inspect drain plugs and washers, replace if necessary.
- 6 Check all pipes, lines and hoses for chafing, leaks and security of connections.
- 7 Check that the front brake caliper-shroud securing bolts are correctly torqued.
- 8 Inspect the front brake pads for wear.
- 9 Inspect the brake discs for wear in accordance with EMEI Vehicle D 393.
- 10 In a tropical area, brake fluid is required to be changed more frequently in accordance with EMEI Vehicle A 459-2.
- 11 Re-torque the front axle stabiliser bar mounting bolts (brackets to chassis).
- 12 Lubricate the MRV right-hand rear-view mirror ball joint, through the mirror housing slots (remove the back housing as required), using WD40 or equivalent spray lubricant.
- 13 Remove the batteries, wash the battery compartment and repaint if required. Lubricate the battery slides with a spray lubricant. Lightly coat the battery terminals with petroleum jelly (PX7).
- 14 Check the step for operation and security.
- 15 Refer to EMEI Vehicle D 398-1 anchor points only.
- 16 Re-torque the steering box mounting bolts at every major and alternate major service.
- 17 Drain and replace the oil in the power steering reservoir. Replace the filter. Inspect the bevel boxes for oil leaks and top up the bevel angle drives (if required) with OEP-220 oil at every alternate major service.
- 18 Inspect all linkages and shafts for wear.
- 19 Rotate the rollers whilst greasing.

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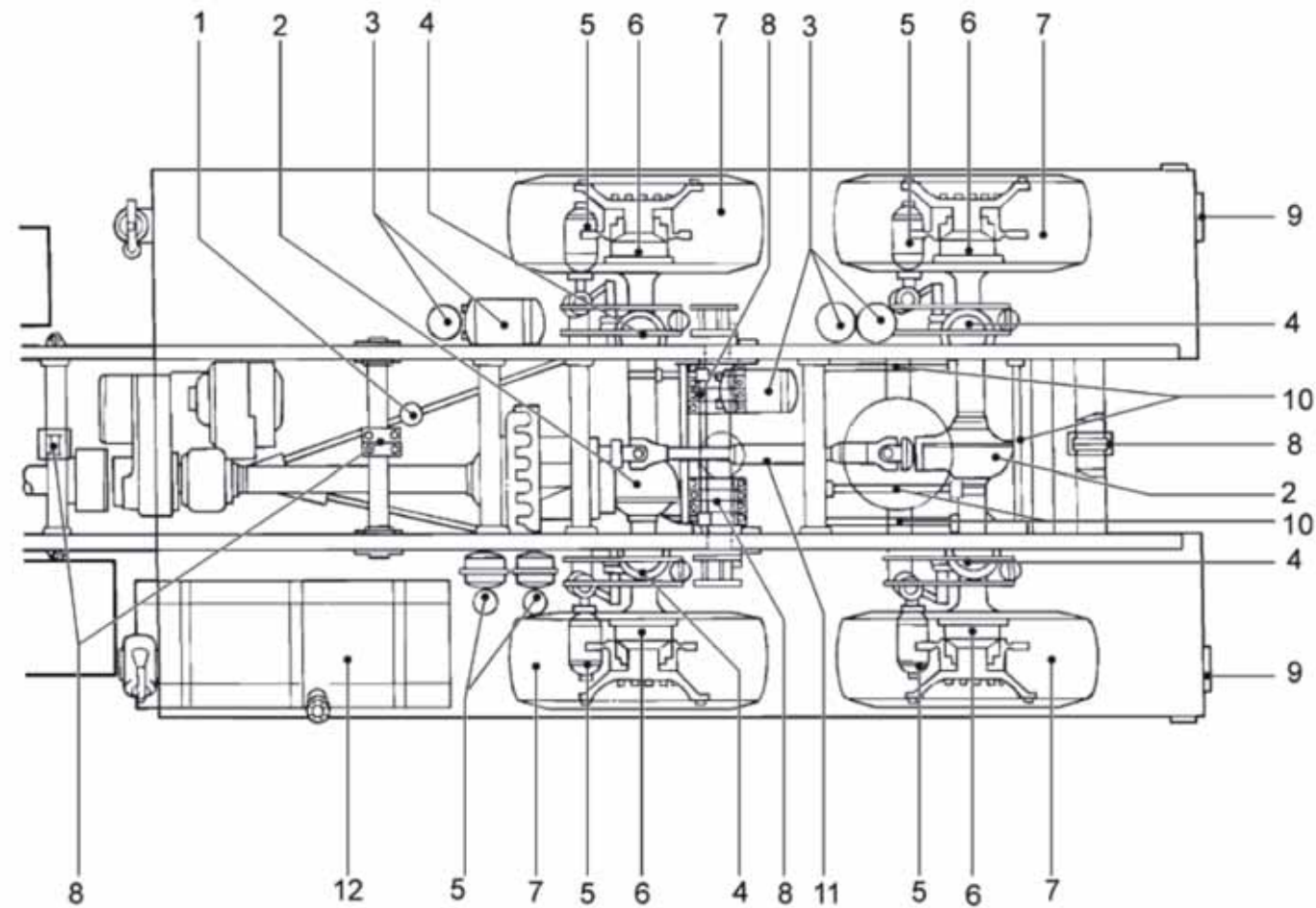

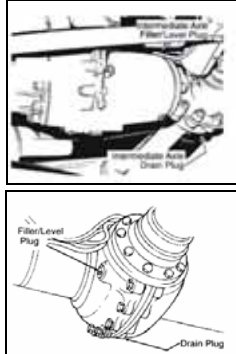


Figure 3 Driveline/Cab/Chassis – Rear

Table 7 Servicing Requirements for Driveline/Cab/Chassis – Rear

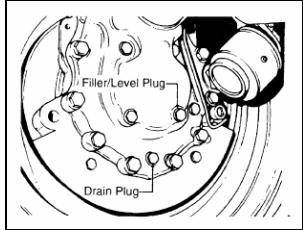

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Air system dehumidifier cartridge (Note 2)	N/A	R	R			Figure 3 Item 1 	1
2	Intermediate and rear axle differentials (Note 3)	U	E	E	OEP-220	2.5	Figure 3 Item 2 	2

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Table 7 Servicing Requirements for Driveline/Cab/Chassis – Rear (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
3	Air reservoirs (Note 4)	I, B	I, B	I, B			Figure 3 Item 3	5
4	Rear suspension system	I	I	I			Figure 3 Item 4	4
5	Brake system (Notes 5, 6, 7, 8 and 9)	I, T, E	I, T, E	I, T, E	OX(AUST)-8	1.0	Figure 3 Item 5	6
6	Intermediate and rear wheel hub drives (Note 3)	U	E	E	OEP-220	0.6	Figure 3 Item 6 	4
7	Wheels, tyres and CTIS (Notes 10 and 11)	I, T	I, T	I, T			Figure 3 Item 7	5
8	Sub-frame mounts (Note 12)	C, I, T, L	C, I, T, L	C, I, T, L	Shell Retinax LX2		Figure 3 Item 8 	5
9	Rear and side lights	I	I	I			Figure 3 Item 9	8
10	Stabiliser mountings (Note 13)	I, T	I, T	I, T			Figure 3 Item 10	2
11	Rear propeller shaft (Note 14)	I, L, T	I, L, T	I, L, T	Shell Retinax LX2		Figure 3 Item 11	2
12	Fuel tank (Note 15)	C, I	C, I	C, I			Figure 3 Item 12	1

**Legend:** B – Bleed, C – Clean, E – Evacuate/Drain and Refill, I – Inspect and/or Correct, L – Lubricate, R – Replace, T – Tighten/Free Up, U – Check and Top Up, N/A – No Action

**Notes:**

- 1 Table 7, Servicing Requirements for Driveline/Cab/Chassis – Rear, refers to Figure 3, Driveline/Cab/Chassis – Rear.
- 2 Replace the filter cartridge in accordance with EMEI Vehicle D 393 (Group 8 – Brake System).
- 3 During evacuate, drain and refill servicing procedures, clean/inspect drain plugs and washers, replace if necessary.
- 4 Any time the compressed air reservoirs are bled and condensation discharges from the drain valves the dehumidifier is to be replaced immediately.
- 5 Check all pipes, lines and hoses for chafing, leaks and security of connections and mounts.
- 6 Check that the brake caliper-shroud securing bolts are correctly torqued.
- 7 Inspect the brake pads for wear.
- 8 Inspect the brake discs for wear in accordance with EMEI Vehicle D 393.
- 9 In a tropical area, brake fluid is required to be changed more frequently in accordance with EMEI Vehicle A 459-2.
- 10 Check the condition of the tyres. Check the security of the spare wheel. Rotate the wheels in accordance with the Technical Manual Operator Handbook (Para 2.r). Ensure the wheel nuts are re-torqued after 50 km.
- 11 Check the CTIS for maximum system pressure (part of CTIS servicing in Table 6, Serial 3 and Table 6, Note 4).
- 12 Grease the rear recovery platform mount only.
- 13 Re-torque the intermediate and rear axle stabiliser bar mounting bolts (brackets to chassis).
- 14 Apply Loctite 243 to the threads of any loose securing bolts and torque to 75 N.m.
- 15 Check the security of the fuel tank mounting straps. Inspect and clean the filler strainer element (replace if damaged).

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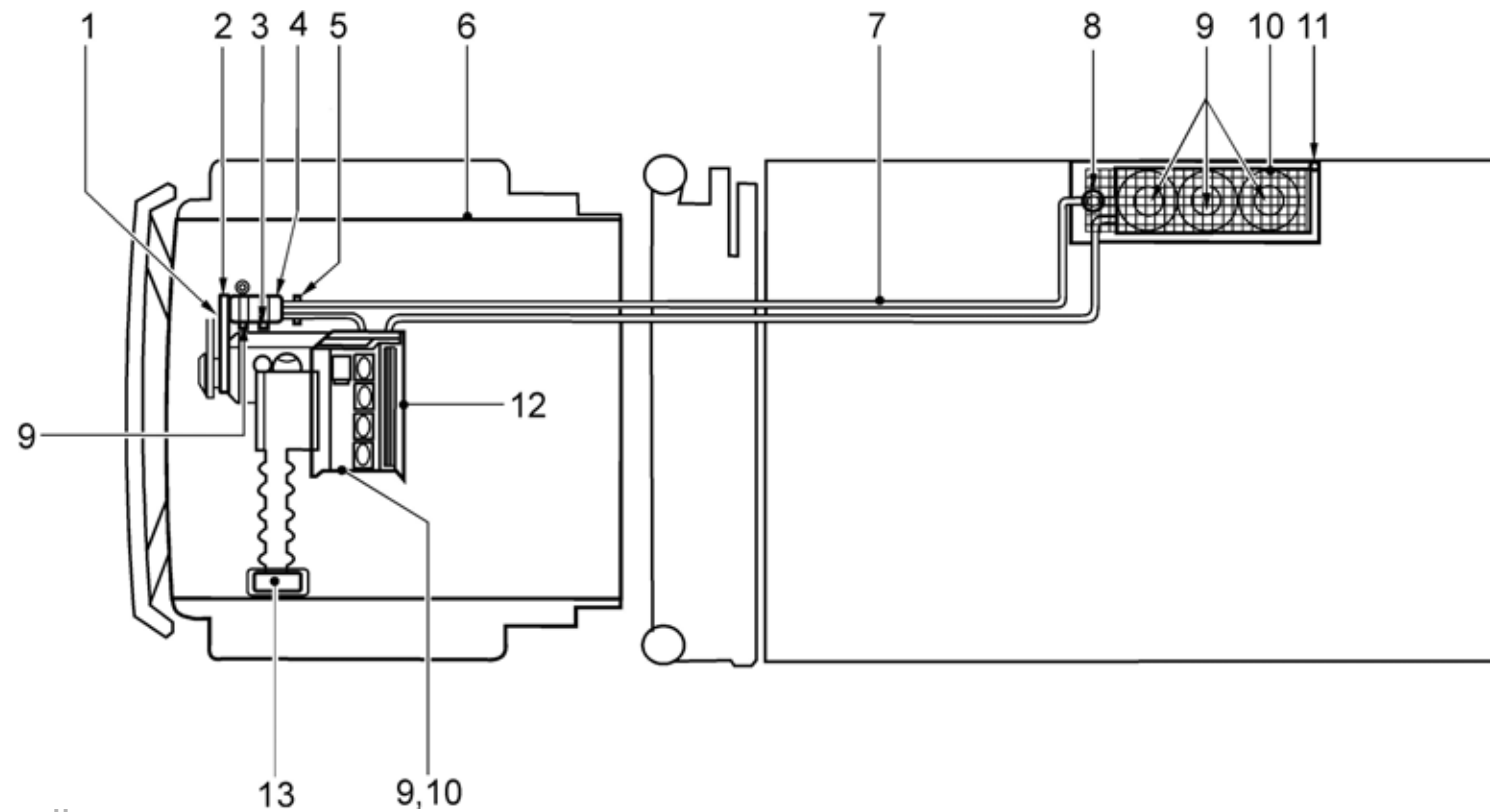


Figure 4 Heating and Ventilation

Table 8 Servicing Requirements for Heating and Ventilation System

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Air-conditioner compressor drive belt	I	I	I			Figure 4 Item 1	1
2	Air-conditioner compressor clutch pulley/hub (Note 2)	C, I	C, I	C, I			Figure 4 Item 2	1
3	Air-conditioner compressor mounting bolts (Note 3)	T	T	T			Figure 4 Item 3	2
4	Air-conditioner compressor oil level (Note 4)	I	I	U	Ester Grade RL68	220 ml	Figure 4 Item 4	1
5	System charge (Note 5)	I	I	E			Figure 4 Item 5	
6	Seals and insulation	I	I	I			Figure 4 Item 6	
7	Refrigerant lines/hoses	I	I	I			Figure 4 Item 7	6
8	Filter receiver drier (Notes 6 and 7)	N/A	R	R			Figure 4 Item 8	1
9	Air-conditioner fans (evaporator, compressor and condenser) (Notes 8 and 9)	I	I	I			Figure 4 Item 9	3
10	Evaporator and condenser cores and cooling fins (Note 9)	I	I	I			Figure 4 Item 10	3
11	Condensation drains (Note 10)	I	I	I			Figure 4 Item 11	2
12	Return air filter (Note 11)	C	C	R			Figure 4 Item 12	1
13	Cabin fresh air filter (Note 11)	C	C	R			Figure 4 Item 13	1

Legend: C – Clean, E – Evacuate/Drain and Refill, I – Inspect and/or Correct, N/A – No Action, R – Replace, T – Tighten/Free Up, U – Check and Top Up

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**Table 8 Servicing Requirements for Heating and Ventilation System (Continued)**

**Notes:**

- 1 Table 8, Servicing Requirements for Heating and Ventilation System, refers to Figure 4, Heating and Ventilation.
- 2 Check for bearing wear/noise and that rotation is true. Remove the hub and clean if necessary.
- 3 Re-torque the air conditioner compressor mounting bolts.
- 4 Carry out the oil check and charge procedures in accordance with EMEI Vehicle D 394. Check for leaks around fittings and shaft seal.
- 5 If the system has been opened to carry out repairs, an evacuation period of one hour is sufficient provided connections have been capped during the repair.
- 6 A milky appearance in the receiver drier sight glass does not indicate a system fault when using polyester oil and R134a gas.
- 7 The receiver drier must be replaced whenever the system has been opened.
- 8 Inspect all fans visually and by hand ensuring the rotors are not loose on their respective motor shafts and running true and all attaching bolts/screws are secure. Clean as required.
- 9 If required, clean the condenser unit and the evaporator coil with either air or water taking care not to use excessive pressure which can damage other components and/or the fins on the condenser and evaporator units.
- 10 Ensure that drain valves are fitted to the ends of each drain and operate correctly checking there are no blockages or kinked tubes.
- 11 More frequent cleaning may be required under dusty conditions, replace the filter if necessary.

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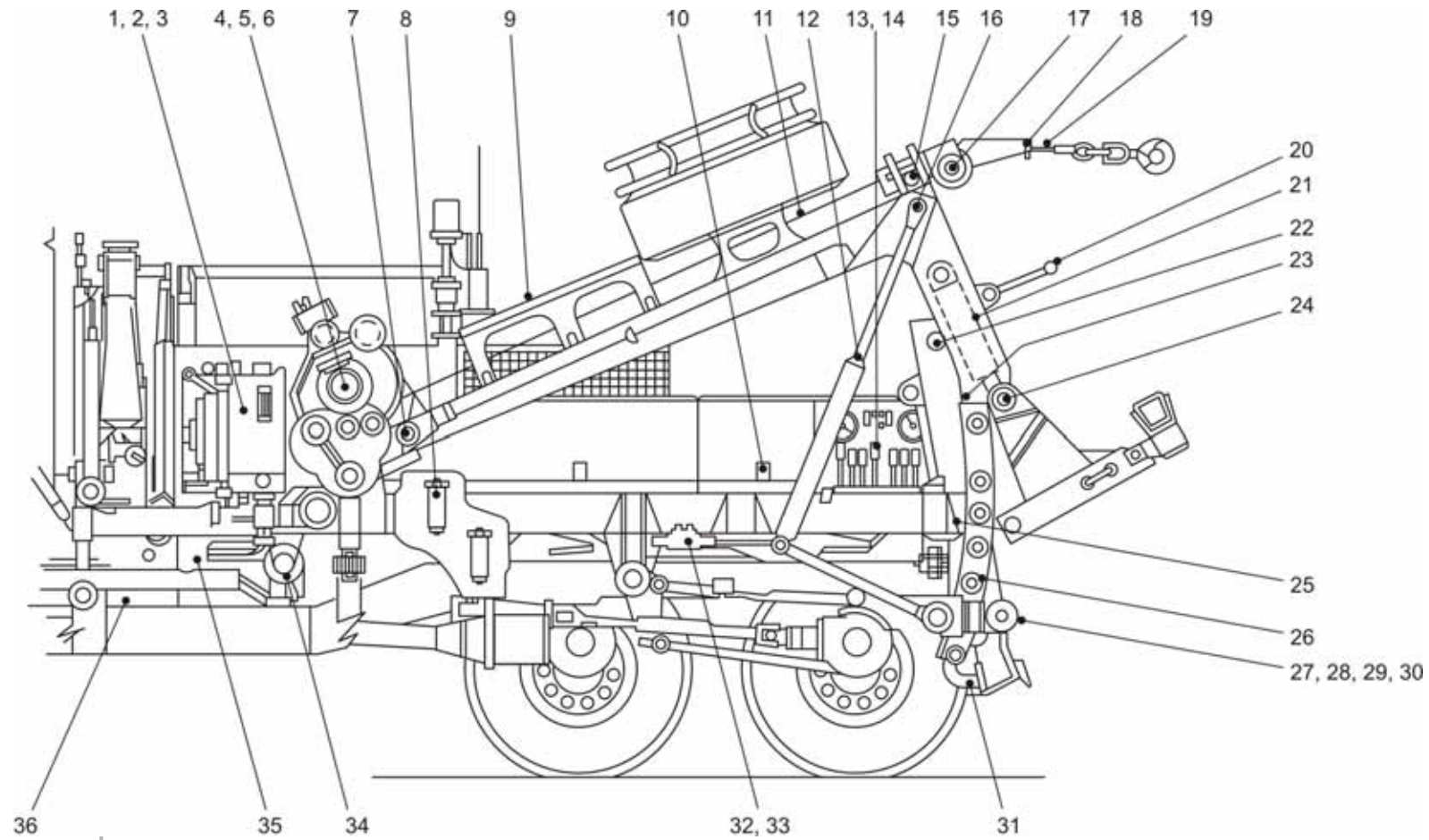


Figure 5 Recovery Equipment Servicing Points

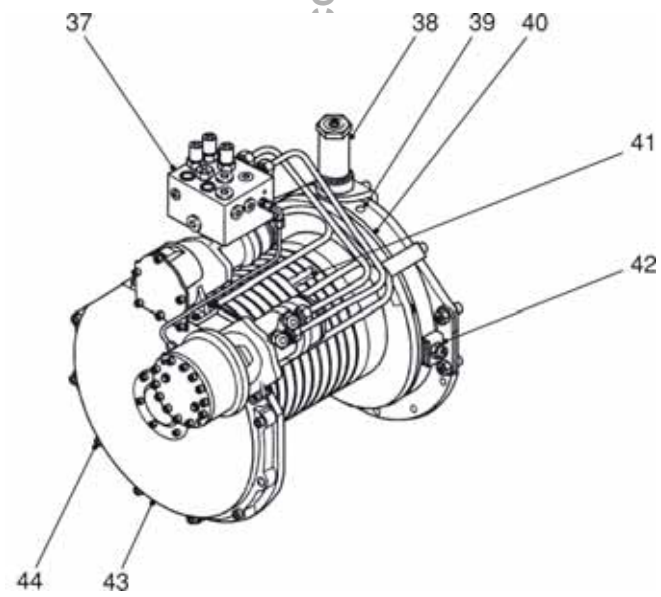


Figure 6 Winch

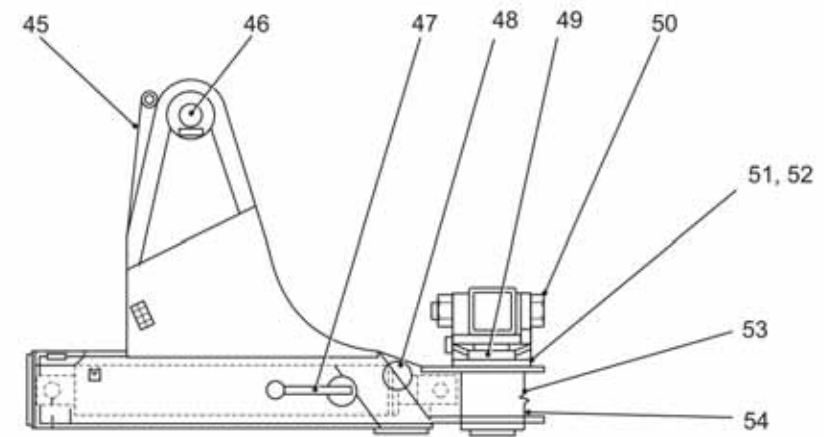


Figure 7 Folding Boom Assembly

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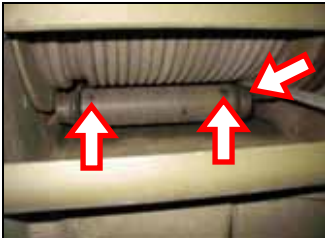
Table 9 Servicing Requirements for Recovery System

**WARNING**

Personnel are not to position themselves under the main boom when it is not secured/locked by pinning.  
Personnel are to stay clear of the folding boom operating pathway and when it is unlocked from the travel lock in the raised position.

**CAUTION**

CES cabinets are to be emptied of CES items prior to removal and replacement.

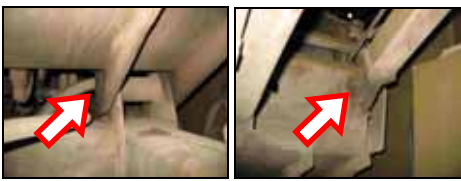


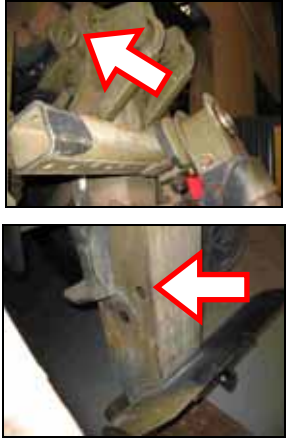
Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Hydraulic system (Notes 2 and 3)	U	E	E	Tellus 68	94 (Wet)	Figure 5 Item 1	1
2	Hydraulic tank return filter and seals (Notes 2 and 4)	I	R	R			Figure 5 Item 2 	1
3	Hydraulic tank cap-breather/filter, temperature level switch and oil level/temperature indicator	C, I	C, I	C, I			Figure 5 Item 3 	4
4	Cable tensioning system (flat rating device) (Including ball-joints and linkages) (Note 5)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 5 Item 4 	6
5	Winch pressure rollers (lightly oil recess holes) (Note 6)	C, I, L	C, I, L	C, I, L	OMD-115		Figure 5 Item 5 	6
6	Winch calibration (Note 7)	N/A	I, A	I, A			Figure 5 Item 6 EME1 Vehicle D 399-1	2

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Table 9 Servicing Requirements for Recovery System (Continued)



Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
7	Main boom and side stay pivots	L	L	L	Shell Retinax LX2		Figure 5 Item 7 	4
8	Recovery system winch pressure filters (Notes 2 and 8)	R	R	R	Tellus 68		Figure 5 Item 8 	2
9	Storage and camouflage platforms	I	I	I			Figure 5 Item 9	3
10	Cabinet door locks and hinges	I, L	I, L	I, L	OMD-115		Figure 5 Item 10	16
11	Rope brake (Note 9)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2 OMD-115		Figure 5 Item 11 	2
12	Main boom lifting cylinder-rod wiper seals	C, I	C, I	C, I			Figure 5 Item 12	2
13	Work stations (Notes 10, 11, 12 and 13)	I, L	I, L	I, L	OMD-115		Figure 5 Item 13	2
14	Engine power take off (PTO) high idle (Note 14)	I	I	I			Figure 5 Item 14 	2
15	Return of tackle points (spade legs and main boom)	C, I, L	C, I, L	C, I, L	OMD-115		Figure 5 Item 15 EME1 Vehicle D 398-1 	4

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
16	Main boom lifting cylinder upper and lower pins (one nipple per pivot point)	L	L	L	Shell Retinax LX2		Figure 5 Item 16 	4
17	Boom head fairlead assemblies and sheaves (Note 6)	I, L	I, L	I, L	Shell Retinax LX2		Figure 5 Item 17 	4
18	Fairlead guide wear inserts (Para 15.jj)	I	I	I			Figure 5 Item 18	2
19	Winch ropes	C, I, L	C, I, L	C, I, L	Rocol or suitable lubricant		Figure 5 Item 19 EMEI Vehicle D 108	2
20	Folding boom travel lock	L	L	L	Shell Retinax LX2		Figure 5 Item 20 	1
21	Folding boom hydraulic circuit (Note 3) (perform if not completed as part of Serial 1).	C, I	C, I, B	C, I, B	Tellus 68		Figure 5 Item 21	1
22	Folding boom hydraulic cylinder linkages and pivot points	L	L	L	Shell Retinax LX2		Figure 5 Item 24 	4

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
23	Spade leg housings, upper and lower cylinder retaining pins (Note 15)	L	L	L	Shell Retinax LX2		Figure 5 Item 22 	6
24	Main boom wear plates (quadrant) (Para 15.ff)	C, I	C, I	C, I			Figure 5 Item 23 EMEI Vehicle D 399-2 	2
25	Recovery system base frame rest pad (main boom) (Note 16)	C, I	C, I	C, I			Figure 5 Item 25 	1
26	Main boom locking pins to recovery sub-frame quadrant recess holes adjustment (Note 17)	I, A	I, A	I, A			Figure 5 Item 26 EMEI Vehicle D 399-2	16
27	Spade leg housing internal wear pads	C, I	C, I	C, I			Figure 5 Item 27 EMEI Vehicle D 399-2 	4



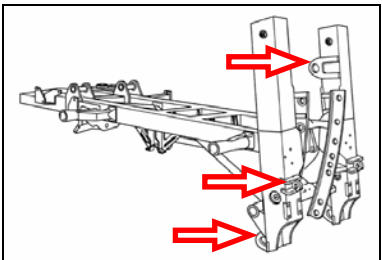


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Table 9 Servicing Requirements for Recovery System (Continued)

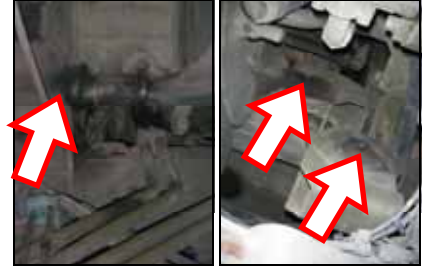


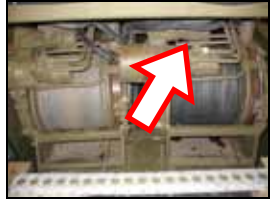

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
28	Rear recovery sub-frame (main boom) quadrant slides	C, I, L	C, I, L	C, I, L	Molybond 122L dry film lubricant		Figure 5 Item 28 	2
29	Main boom locking pins and seals	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 5 Item 29 	2
30	Tow pintle (Note 18)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 5 Item 30 EMEI Vehicle D 398-1	1
31	Lifting, tie-down and rear self recovery points	C, I, L	C, I, L	C, I, L	OMD-115		Figure 5 Item 31 EMEI Vehicle D 398-1 	6
32	Mountings, pipes and hoses (Note 19)	C, I	C, I	C, I			Figure 5 Item 32 	
33	Directional control valve cables, yokes, clevis pins and solenoid exhaust ports (Note 20)	C, I, L	C, I, L	C, I, L	WD40 or equivalent		Figure 5 Item 33 EMEI Vehicle D 393 	

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
34	Front winching re-directional winch rope sheaves and deflector roller (Note 6)	C, I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 5 Item 34 	3
35	Hydraulic pump – triple segment	C, I	C, I	C, I, T			Figure 5 Item 35 	1
36	Side access step (Note 21)	I, L	I, L	I, L	OMD-115		Figure 5 Item 36 	1
37	Winch hydraulic components and hydraulic lines (Note 19)	C, I	C, I	C, I			Figure 6 Item 37 	
38	Winch pneumatic disengagement device assembly (free-spool cylinder), airlines and connections	O, I, A	O, I, A	O, I, A	Rubber grease XG-315		Figure 6 Item 38 EMEI Vehicle D 399-2 	2

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
39	Winch gear ring recess holes (for locating free spool cylinder piston)	C, I	C, I	C, I			Figure 6 Item 39 	4
40	Winch gear ring v-seal (Note 22)	C, I, L	C, I, L	C, I, L	Molykote 111		Figure 6 Item 40 EMEI Vehicle D 399-2 	2
41	Winch drum and winch rope security (Note 23)	C, I	C, I	C, I			Figure 6 Item 41	2
42	Winch drum brakes (Para 15.cc)	C, I, A	C, I, A	C, I, A	Anti-seize		Figure 6 Item 42 EMEI Vehicle D 399-2 	2
43	Winch (moisture) drain plug	C, I, E	C, I, E	C, I, E	Anti-seize		Figure 6 Item 43 EMEI Vehicle D 399-2 	2
44	Winch mounting bolts (Note 24)	I	I	I, T			Figure 6 Item 44 EMEI Vehicle D 394 	24

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
45	Main boom to folding boom wear strips (15.gg)	C, I	C, I	C, I			Figure 7 Item 45 	4
46	Folding boom to main boom pivot pin (one nipple per side)	L	L	L	Shell Retinax LX2		Figure 7 Item 46 	2
47	Extension boom lock (Note 25)	I, L	I, L	I, L	Shell Retinax LX2		Figure 7 Item 47 	1
48	Folding boom to extension boom internal wear pads (Para 15.hh) (Note 26)	C, I	C, I	C, I			Figure 7 Item 48 	5
49	T-bar buffer pads (Para 15.oo)	C, I	C, I	C, I			Figure 7 Item 49 	2

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Table 9 Servicing Requirements for Recovery System (Continued)


Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
50	T-bar pin	L	L	L	Shell Retinax LX2		Figure 7 Item 50 	1
51	T-bar yoke free play (Para 15.kk)	I, L, A	I, L, A	I, L, A	Shell Retinax LX2		Figure 7 Item 51 	1
52	Yoke extension boom shaft, spacer (bronze wear spacer) and extension boom bush (Note 27)	I, L	C, I, L	C, I, L	Shell Retinax LX2		Figure 7 Item 52 	1
53	Recovery tow hitch for cracks (Note 28 and 29)	C, I	C, I	C, I			Figure 7 Item 53 EMEI Vehicle D 399-2 	
54	Extension boom (bush) to yoke	L	L	L	Shell Retinax LX2		Figure 7 Item 54 	1

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Table 9 Servicing Requirements for Recovery System (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
55	Self recovery operating switch for left-hand winch (main cabin) (Note 30)	I	I	I				1
56	Perform recovery system function test	I	I	I			EMEI Vehicle D 399-2	1

**Legend:** A – Adjust, B – Bleed, C – Clean, E – Evacuate/Drain and Refill, I – Inspect and/or Correct, L – Lubricate, U – Check and Top Up, R – Replace, T – Tighten/Free Up, O – Overhaul, N/A – No Action

**Notes**

- 1 Table 9, Servicing Requirements for Recovery System, refers to Figure 5 – Recovery Equipment Servicing Points, Figure 6 – Winch and Figure 7 – Folding Boom Assembly.
- 2 Hydraulic system checks:
  - a. When changing the hydraulic oil and filters configure the MRV as follows:
    - (1) lower the main boom,
    - (2) retract the earth anchors and extension boom fully,
    - (3) lower the folding boom onto its stops, and
    - (4) stow the crane and outriggers.
  - b. When checking the hydraulic tank oil level configure the MRV as follows:
    - (1) position the main boom in the normal travel position (third quadrant hole from the bottom),
    - (2) retract the earth anchors and extension boom fully, and
    - (3) stow the folding boom.
- 3 Due to the singular action of the folding boom cylinder, the cylinder and hydraulic supply lines must be bled and old oil purged when changing the hydraulic oil and filters at every major and alternate major service (Table 9, Serial 1 and 21). The following procedure is to be used when bleeding air from the folding boom hydraulic cylinder and hose:
  - a. Release the folding boom and fully lower to the down position.
  - b. Raise the main boom so that the hydraulic hose connection through the front of the boom to the folding boom cylinder is accessible.
  - c. Engage the safety locking pins to lock the main boom in position.
  - d. Disengage the PTO and stop the engine.

**WARNING**

**Caution is to be exercised, as the oil may be hot.**

**Safety glasses are to be worn as the oil is under pressure.**

  - e. Disconnect the hydraulic oil supply line to the folding boom cylinder at the supply tube connection situated at the back of the boom and drain the hydraulic oil from the supply line and tube.
  - f. Disconnect the folding boom cylinder supply line from the directional control valve and drain hydraulic oil from the line.
  - g. Reconnect both the folding boom cylinder supply line at the directional control valve and the hydraulic oil line to the folding boom cylinder at the supply tube connection.
  - h. Start the engine and engage the PTO (engine is to be at idle speed only).
  - i. With caution, pull the control lever to raise the folding boom; at the same time carefully loosen the hydraulic supply line fitting at the folding boom cylinder. Bleed/purge hydraulic oil into a suitable container until no air escapes from the fitting. Up to two to three litres of oil may have to be bled from the line to purge air from the cylinder. When there is no more air bubbles in the oil being bled tighten the hose fitting and clean the area.
  - j. Engage the engine high idle, raise and lower the folding boom a minimum of three times checking that the response of the folding boom is commensurate with the lever operation. If there is a lag experienced between activation and operation or the control of the folding boom is spongy, repeat the procedures in sub-sub Paras i. and j.
  - k. Disengage the engine high idle.
  - l. Disengage the PTO and shut down the engine.
  - m. Top up the hydraulic tank ensuring that all implements of the MRV are in travel mode (Note 2).
- 4 Inspect the hydraulic tank return filter line pressure gauge during operation. If the pressure gauge indicator is outside the green area replace the filter.

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**Table 9 Servicing Requirements for Recovery System (Continued)**

- 5 A hand-operated grease gun is to be used to ensure grease enters components. A single pump at each point is sufficient for proper lubrication. If the dust excluder becomes overfilled, release the bottom tie and remove excess grease. Secure the bottom of the dust/moisture boot into position using a droplet of Loctite 401 and clamp it with a suitable cable tie.
- 6 Rotate the sheaves/rollers whilst lubricating.
- 7 The procedures to carry out the winch calibration, additional inspection and adjustments are in accordance with EMEI Vehicle D 399-1.
- 8 Tension the filter bowls to 20 N.m. Inspect the oil filter by-pass indicators for damage and ensure the indicators are green on replacement of filters.
- 9 Inspect and service in accordance with EMEI Vehicle D 396-1.
- 10 Ensure that all identification and instruction plates are legible. Replace where applicable.
- 11 Lubricate only the left-hand work station (operating levers).
- 12 Check pressure gauges for leaks and functionality.
- 13 Check all work station switches for correct operation.
- 14 Check for correct engine speed (1450 to 1550 rpm); adjust in accordance with EMEI Vehicle D 399-2.
- 15 To grease the lower spade leg pins, lower the spade legs, remove the grease nipple blanking plugs and fit a grease nipple to enable greasing of the lower pins. On completion, remove the grease nipples, refit the blanking plugs and raise the spade legs.
- 16 Check the rest pad for security and damage.
- 17 Check for correct insertion of the main boom locking pins to all quadrant recess holes.
- 18 Visually inspect the tow pintle locating blocks for cracks and damage on the rear crossmember.
- 19 Check all pipes, hoses and hydraulic lines for chafing, leaks and security of connections.
- 20 Clean and inspect the solenoid exhaust ports ensuring the exhaust holes are clean and free from obstructions. Lightly lubricate inside the solenoid cylinders through the exhaust ports.
- 21 Check for operation and security.
- 22 For damaged V-seals, replace in accordance with EMEI Vehicle D 399-2.
- 23 Inspect the winch rope for correct fitting to the winch drum. Visually check the winch drum for cracks and damage.
- 24 Winch mounting bolts are to be re-torqued (Para 14.z) every 48 months or 40 000 km. To gain access to the left winch securing bolts, the left-hand CES cabinets are required to be removed. The left-hand CES cabinets are to be emptied of all CES items prior to removal/replacement.
- 25 Lubricate lightly and check the boom extension lock, in all extension boom housing locating holes for security.
- 26 Remove the extension boom from the folding boom to check the wear pads as follows:
  - a. With the folding boom in the lowered position, extend the extension boom.
  - b. Lubricate then remove the cylinder retaining pin connected to the extension boom.
  - c. Manually remove the extension boom taking care that the extension boom does not lower and contact the cylinder ram.
  - d. Visually inspect the extension boom cylinder rod end and cylinder wiper seal for wear and cracks.
  - e. Measure all the wear pads fitted to the internal folding boom and external extension boom (quantity five).
  - f. Manually replace the extension boom taking care that the extension boom does not lower and contact the cylinder ram.
  - g. Lubricate the cylinder retaining pin liberally with grease prior to installation.
  - h. Reinstall the cylinder retaining pin.
  - i. Retract and stow the tow hitch in travel mode.
- 27 Inspect the yoke extension boom shaft, extension boom bush and bronze wear spacer for wear every 24 months or 20 000 km (Para 14.nn and 14.pp).
- 28 Visually inspect the following areas for cracks and/or deformation:
  - a. at the junction of the gussets of the main mounts to the chassis and the longitudinal members of the sub-frame;
  - b. at the junction of the crosshead with the main boom;
  - c. at the vee bracket mount attaching the front of the recovery platform to the chassis;
  - d. at the base of the vertical lugs contained to the yoke extension boom;
  - e. at the yoke extension boom shaft at the junction with the base of the top plate of the yoke;
  - f. At the welds around the centre of the T-bar at the strengthening plates;
  - g. On the top of the extension boom where the step in height meets the lower section of the extension boom (yoke retainment area);
  - h. On the machined surface of the extension boom where the yoke extension boom mates; and
  - i. At the extension boom boss (yoke retainment area) at all welds/joins on the lower and upper plate sections.
- 29 The recovery tow hitch is to be tested for cracks or deformation utilising dye penetrant testing every 48 months or 40 000 km. The test is to be conducted in accordance with EMEI Vehicle D 399-2.
- 30 Check for correct operation (self centring).

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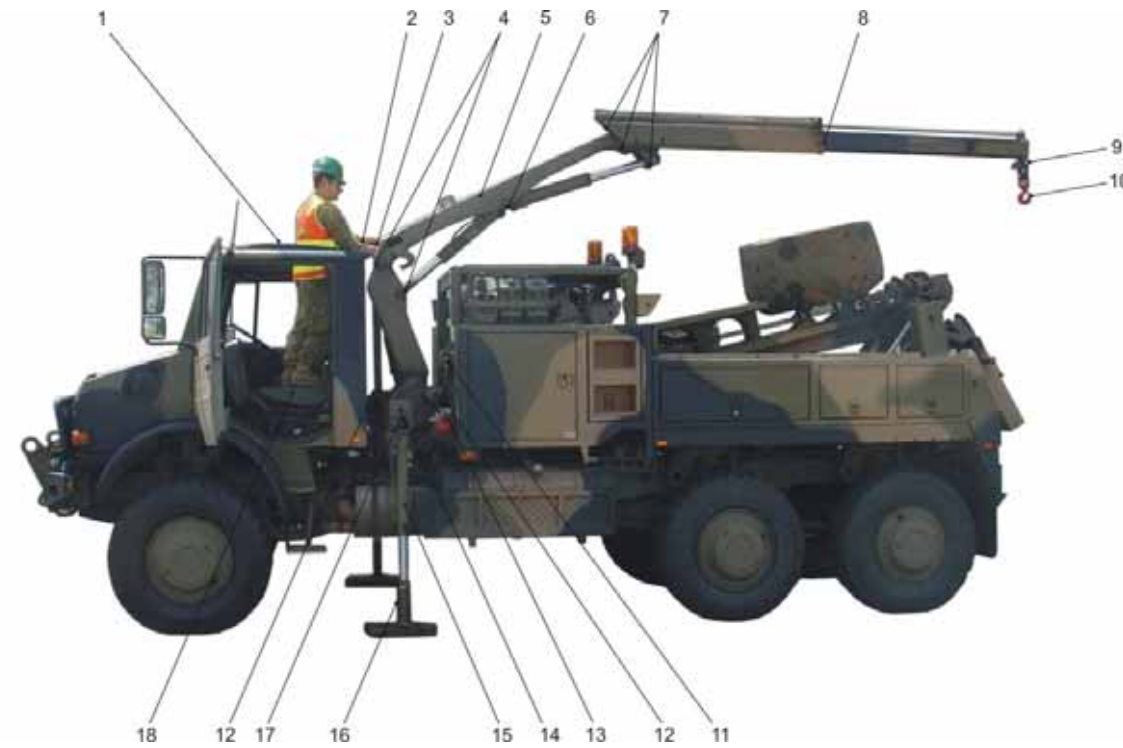


Figure 8 Crane Servicing Points

Table 10 Servicing Requirements for Crane

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**WARNING**

Outriggers are to be deployed correctly prior to deployment of the crane.  
Personnel are not to stand under the crane when it is deployed

**CAUTION**

Ensure the passenger seat back rest retaining latch is operated when lowering the back-rest to configure the work station for crane operations.

Ensure the crane cargo swivel hook and shackle is removed from the crane boom and check that the out-riggers and crane boom are correctly stowed prior to operating the vehicle in travel mode.

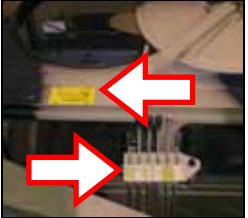

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
1	Cab roof cupola (Note 2)	I, L	I, L	I, L	WD40 or equivalent		Figure 8 Item 1	1
2	Crane identification and instruction plates (Note 3)	I	I	I			Figure 8 Item 2 	8
3	Control levers, lever pivot points and peak pressure button (overload button) (Note 4)	I, L	I, L	I, L	OMD-115		Figure 8 Item 3 	18



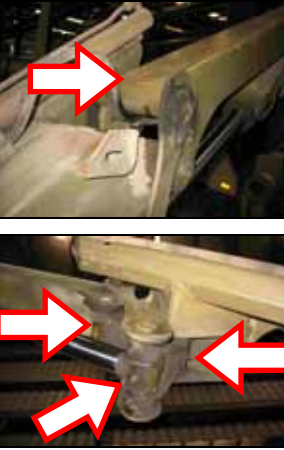


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Table 10 Servicing Requirements for Crane (Continued)



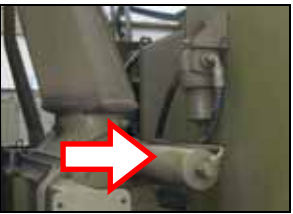


Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
4	Crane column to main boom pivot point and cylinder connection pivot point	I, L	I, L	I, L	Shell Retinax LX2		Figure 8 Item 4 	2
5	Crane (Note 5)	I	I	I			Figure 8 Item 5	1
6	Main boom centre, cylinders connection/pivot point	I, L	I, L	I, L	Shell Retinax LX2		Figure 8 Item 6 	3
7	Main boom to outer boom pivot point and linkage assembly	I, L	I, L	I, L	Shell Retinax LX2		Figure 8 Item 7 	6
8	Extension boom guide blocks and boom extension cylinder guide parts (Note 6)	L	CIL	CIL	Shell Retinax LX2		Figure 8 Item 8 	4
9	Extension boom hook pivot	I, L	I, L	I, L	Shell Retinax LX2		Figure 8 Item 9 	1
10	Cargo swivel hook and shackle	I, L	I, L	I, L	OMD-115		Figure 8 Item 10	1

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Table 10 Servicing Requirements for Crane (Continued)




Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
11	Crane hydraulic oil filter (Note 7)	R	R	R			Figure 8 Item 11 	1
12	Crane base mounting bolts (Note 8)	T	T	T			Figure 8 Item 12 	3
13	Slew housing (tube, cylinders) (Note 9)	I	I	I			Figure 8 Item 13 	2
14	Central lube station, for lubrication of: 1. Slewing rack 2. Column upper and lower bush	L	L	L	Shell Retinax LX2		Figure 8 Item 14 	3
15	Stabilisers and covers (Note 10)	I	I	I			Figure 8 Item 15 	2

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Table 10 Servicing Requirements for Crane (Continued)

Serial	Item or Assembly (Note 1)	Minor Service 12 Months/10 000 km	Major Service 24 months/20 000 km	Alt Major Service 48 Months/40 000 km	Lubricant	Capacity (litres)	Figure/Reference	Number of Points
16	Stabiliser foot plates	I, L	I, L	I, L	WD40 or equivalent		Figure 8 Item 16 	2
17	Stabiliser legs pivot (Note 11)	I, L	I, L	I, L	Shell Retinax LX2		Figure 8 Item 17 	2
18	Work station (passenger seat) (Notes 12 and 13)	I, L	I, L	I, L	WD40 or equivalent		Figure 8 Item 18 	1
19	Crane operation (Notes 14 and 15)	I	I	I				
20	Perform crane function test	I	I	I			EMEI Vehicle D 399-2	1

**Legend:** C – Clean, I – Inspect and/or Correct, L – Lubricate, R – Replace, T – Tighten/Free Up

**Notes**

- 1 Table 10, Servicing Requirements for Crane, refers to Figure 8, Crane Servicing Points.
- 2 Check cupola for correct operation and security (open and closed position). Lubricate the pivot point and linkages.
- 3 Ensure that all identification and instruction plates are legible. Replace where applicable.
- 4 Ensure the peak pressure button rubber boot is present and functional.
- 5 Visually check for cracks, signs of corrosion and deformation.
- 6 Visually inspect the internal guide block of the outer boom to the extension boom housing (hook end); ensure extension boom housing is not contacting the outer boom housing on deployment. Replace worn or damaged guide blocks in accordance with EMEI Vehicle D 394.
- 7 Inspect the oil filter by-pass indicator for damage and ensure the indicator is green on replacement of the filter, replace if necessary in accordance with EMEI Vehicle D 393. The filter bowl is to be tensioned to 20 N.m on replacement of the filter.
- 8 Re-torque the crane base mounting bolts in accordance with Table 3.
- 9 Visually check the tube cylinders for security and oil leaks.
- 10 Replace covers if damaged.

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**Table 10 Servicing Requirements for Crane (Continued)**

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|---|
| <p>11 Check the legs for correct rotation.</p> <p>12 Check the passenger seat for correct operation when utilised as a work station for crane operations.</p> <p>13 Lightly lubricate the passenger seat back rest retaining latch.</p> <p>14 Visually check all pipes, hoses and oil lines for chafing, leaks and security of connections prior to operation.</p> <p>15 Perform the function test on the peak pressure button in accordance with the Technical Manual Operator Handbook (Para 2.r). Visually inspect the crane during the operation for oil leaks and check for smooth operation utilising all controls.</p> |
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**END**

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