

**TRUCK, WRECKER, HEAVY RECOVERY VEHICLE (HRV), MC3, 123T GCM, 6X6,
MACK 'R' SERIES**

NSN 2320-66-151-7176

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.

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INTRODUCTION

1. This EMEI lists the requirements for each level of servicing for the Truck, Wrecker, Heavy Recovery Vehicle (HRV), MC3, 123T GCM, 6X6, Hydraulic Lift/Tow, W/Twin Winch, Palfinger Crane, Mack 'R' Series. Figures 3 to 9 show the servicing points and tables 4 to 10 detail the servicing requirements for each level of servicing.

Associated Publications

2. Reference may be necessary to the latest issue of the following documents for maintenance, repair and inspection procedures:

- a. AS 1418.11-2007 – Cranes, Hoists and Winches – Vehicle-loading Cranes
- b. AS 2550.11-2004 – Cranes, Hoists and Winches – Safe Use – Vehicle-loading Cranes
- c. Technical Regulation of ADF Materiel Manual - Land (TRAMM-L);
- d. Defence Safety Manual (SAFETYMAN);
- e. Material Safety Data Sheets (MSDS) – Product Information Sheets;
- f. EMEI Vehicle D 108 – Inspection of Recovery Equipment – Inspection for Functionality;
- g. EMEI Vehicle D 322 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), ARMY (AUST) 6778 – (NSN 2320-66-151-7176) – Technical Description;
- h. EMEI Vehicle D 323 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), ARMY (AUST) 6778 – Light Grade Repair;
- i. EMEI Vehicle D 324-1 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), ARMY (AUST) 6778 – Medium Grade Repair;
- j. EMEI Vehicle D 324-2 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), ARMY (AUST) 6778 – Heavy Grade Repair;
- k. EMEI Vehicle D 328-1 – Truck, Wrecker, Heavy Recovery Vehicle (HRV), MC3, 123T GCM, 6X6, Mark 'R' Series – Tow Adaptors – Inspection For Useability;
- l. EMEI Vehicle D 329-1 – Truck, Wrecker, Heavy Recovery Vehicle (HRV), MC3, 123T GCM, 6X6, Mack 'R' Series – Winch Set-up and Constant pull System Check – Miscellaneous Instruction;
- m. EMEI Vehicle G 702 – Truck, Cargo, Heavy, MC3 - Mack – Technical Description;
- n. EMEI Vehicle G 703 – Truck, Cargo, Heavy, MC3 - Mack – Light Grade Repair;
- o. EMEI Vehicle G 704 – Truck, Cargo, Heavy, MC3 - Mack – Medium Grade Repair;
- p. EMEI Vehicle G 704-1 – Truck, Cargo, Heavy, MC3 - Mack – Heavy Grade Repair;
- q. EMEI Vehicle G 709 – Truck, Cargo, Heavy, MC3 – Mack – All variants -Servicing Instruction;
- r. EMEI Vehicle G 794-1 – Truck, Heavy, MC3 – Mack – All Types – Crisp-Air Conditioner- Medium Grade Repair
- s. EMEI Workshop E series – Occupational Health and Safety Instructions;
- t. LWP-CSS-4-2-1 Recovery Handbook, Chapter 4, Safety;
- u. Technical Manual User Handbook – Truck, Wrecker, Heavy Recovery Vehicle (HRV), MC3, 123T GCM, 6X6, Mark 'R' Series;
- v. Crisp-Air Air Conditioning Handbook, March 2004; and
- w. General Pneumatics Maintenance Manual – TruckMaster Air Filter, XD-30 Automatic Ejector and EXT-50 DumpMaster Valves (www.generalpneumatics.com.au).

DETAIL

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.

NOTE

During servicing procedures, bolts and nuts that require re-tensioning or adjusting and have been assembled using thread sealant are to have the thread sealant renewed.

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 their civilian equivalents, as follows:

- a. Mechanic, Vehicle (ECN 229); and
- b. Mechanic, Recovery (ECN 226), to assist with operation and preparation of HRV where required.

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

- a. Minor Service – SJ079;
- b. Major Service – SJ080;
- c. Alternate Major Service – SJ087; and
- d. Complete Technical Inspection – SJ6620.

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

Servicing Intervals

NOTE

When any equipment exceeds the 10 per cent maximum limit, as detailed in Para 10, it is to be classified **Do Not Use – XX** until the outstanding service is completed.

7. When two types of servicing periods are expressed (e.g. 12 months or 20 000 km) the service is to be applied at the expiry of the first occurring period; that is, whichever comes first.

8. Servicing is to be based on distance travelled or time elapsed 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 periods between services or add servicing tasks to meet operational or exercise requirements.

9. 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 permit workload planning.

10. **Servicing Sequence.** The following servicing sequence is to be applied to the HRV:

- a. Minor service – 20 000 km or 12 months from introduction into service.

- b.** Major service – 20 000 km or 12 months from last minor service.
 - c.** Minor service – 20 000 km or 12 months from last major service.
 - d.** Alternate major service – 20 000 km or 12 months after the second minor service has been carried out.
 - e.** The servicing sequence commences again after the alternate major service, with a minor service being carried out after a further 20 000 km or 12 months.
- 11.** Daily, weekly and monthly operator servicing is to be carried out in accordance with the User Handbook.

Crane Re-certification

- 12.** The process for re-certification of the crane is as follows:
- a.** Crane re-certification period – At 10 years and thereafter every 5 years of service, in accordance with AS 1418.11 and AS 2550.11.
 - b.** Check the vehicle GM 120 log book for the date of introduction into service and for any past re-certification of the crane.
 - c.** If the crane is due for re-certification, proceed as follows:
 - (1)** the user unit is to contact the NFM, CGSV SPO, MDM/HVY B Vehicles for further direction/guidance.
 - (2)** any vehicle that’s crane has passed its certification date are to be classified “RU – Crane to be used for Spare Wheel Only”
 - d.** On completion of re-certification of the crane, the user unit 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
 - (3)** that the vehicle is re-classified to remove the restrictions due to the crane re-certification.

Additional Tasks

- 13.** No additional tasks are to be added to schedule maintenance work orders. A separate work order shall be raised to record additional maintenance identified during the servicing and/or the technical inspection. The additional tasks are to be completed in conjunction with the schedule maintenance.

Fluids and Lubricants

- 14.** Table 1 provides a list of fluids and lubricants used on the HRV.

Table 1 Fluids And Lubricants

Serial	Assembly	Type/Grade	Capacity
1	Fuel	Diesel	498 L
2	Engine	Lubricating Oil: Internal Combustion Engine, Combat/Tactical Service, SAE Grade 40 (OMD-115)	55.3 L (including filters)
3	Cooling system	Antifreeze: Inhibited Ethylene Glycol Engine Cooling System	54 L
4	Transmission	OEP-220	12 L
5	Transfer case	OEP-220	9.5 L
6	Front axle (differential)	OEP-220	11.4 L
7	Front wheel bearings	OEP-220	Fill to level plug (level plug horizontal with centre of hub)
8	Intermediate axle	OEP-220	12 L
9	Rear axle	OEP-220	11.2 L
10	Power divider	OEP-220	Fill to level plug
11	Steering	Lubricating Oil: Internal Combustion Engine, Combat/Tactical Service, SAE Grade 40	7.75 L
12	Hydraulics	OM-68	150 L
13	Air system lubricator	Tellus 22 or equivalent	20 ml
14	Winch gear box	Castrol LMX or equivalent	As required during overhaul
15	Winch ropes	Rocol or equivalent SWR lubricant	4 x 500 g aerosol cans per service
16	Pintle hook and towing eye	Dry Film, Molybdenum Disulphide (Molybond 122L)	400 g pressure pack (NSN 9150-66-017-9404)
17	General use grease	XG-291	As required during servicing

Adjustments

15. During servicing, there is a requirement to check and, if necessary, to re-tension drive line, suspension and crane fasteners. Torque settings are detailed in Table 2 and 3. The servicing requirements for these components are detailed in tables 4 to 10 of this document.

16. Valve Clearance Adjustment. Valve clearance adjustments are to be completed at each major service. During valve clearance adjustment procedures, dynatard contact points are to be inspected for serviceability.

17. Clutch Adjustment. The clutch fitted to this vehicle is self-adjusting. Check the clutch wear indicator at each service and replace if necessary.

18. Specifications. Adjustment, measurements and torque requirements are to be conducted in accordance with the following specifications:

- a. Fan Belt Tension approx 12 mm mid point deflection on the longest span using moderate thumb pressure.
- b. Valve Clearance (cold, static):
 - (1) Inlet 0.406 mm
 - (2) Exhaust 0.601 mm

19. Wear limits for the Recovery Unit are as specified in EMEI Vehicle D 324-1.

Table 2 Truck Fastener Torque Settings

Item	Torque Setting
Front Spring U bolts	746 to 814 N.m
Rear air suspension mount	47 N.m
Wheel nuts (inner and outer)	610 to 678 N.m
Torque rod mounting bolts	140 N.m
Traverse rod mounting bolts	146 N.m
Transverse beam castellated nut	271 N.m
Air spring mounting bolts	47 N.m
Shock absorber nut	149 N.m
Equalising beam hanger (bolt and locknut)	71 N.m
Beam hanger bracket to axle (bolt and nut both fine or course thread)	271 N.m

Table 3 Crane Fastener Torque Settings

Serial	Thread Diameter	Property Class	
		8.8	8.8
1	M8	23 N.m	34 N.m
2	M10	46 N.m	68 N.m
3	M12	79 N.m	117 N.m
4	M14	125 N.m	185 N.m
5	M16	195 N.m	280 N.m
6	M18	280 N.m	390 N.m
7	M20	390 N.m	560 N.m
Mounting Shackle Bolts			
	Thread Size	Thread Material 42 Cr Mo 4v	
8	M24 × 1.5	600 N.m	

Crane Lubrication Instructions

20. Lubrication of Boom Bearings. Lubricate the crane boom bearings (bushes) as follows:

- a. Thoroughly clean the area to be lubricated, including the lubrication fitting.
- b. Pump grease into the fitting until the fresh grease flows out of the bearing.
- c. Clean off all excess grease.

21. Lubrication of Crane Column Bearing and Slew Mechanism. Lubricate the crane column bearing and slew mechanism as follows:

- a. Raise the boom safely to its full height, allowing it to be slewed through its full range of movement.
- b. Inject grease into the lubrication fittings then slew the crane through its full range of movement to evenly distribute the grease.
- c. Inject grease into the lower bush until the fresh grease is visible around the circlip at the base of the column.
- d. Inject grease into the upper bush until the fresh grease is visible around the top junction of the column and base.
- e. Clean off all excess grease with a clean cloth and use this to lubricate the extension boom.

22. Lubrication of Extension Boom. Lubricate the extension boom as follows:

- a. Position a wooden plank on the ground at 90° to the vehicle and in line with the crane column.

NOTE

The wooden plank must be long enough to allow the extension boom to be completely retracted while sliding along the plank.

- b. Extend the boom completely and rest it on the plank.
- c. Clean the extension boom, removing all old grease and dirt.
- d. Apply new grease to the top and underside of the extension boom, using a brush or other suitable applicator.
- e. Retract the extension boom under slight pressure (boom down), allowing it to slide along the plank.
- f. Clean off all excess grease.

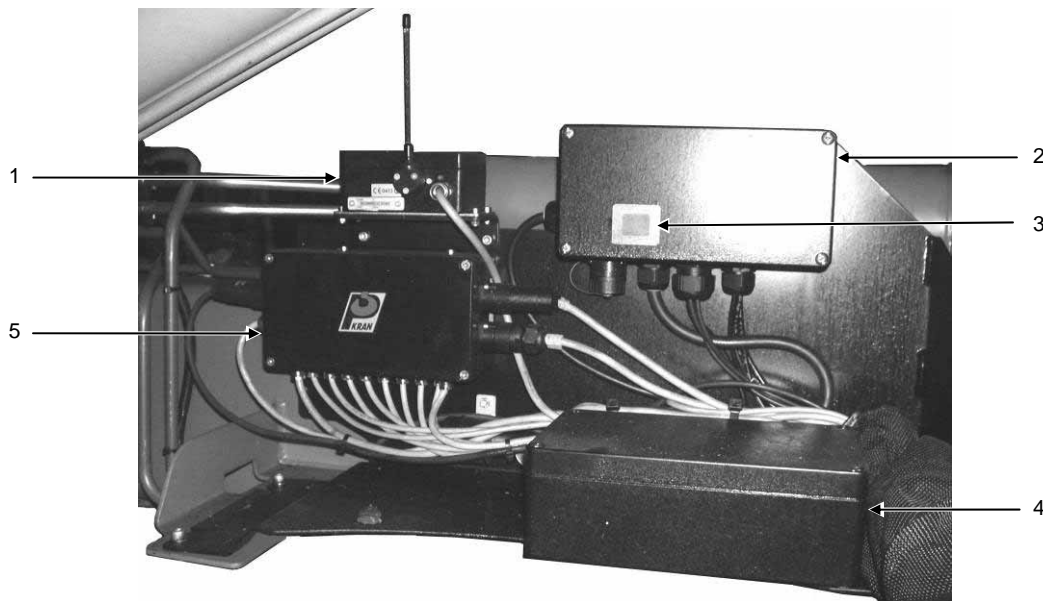
Extendable Boom Piston Rod Maintenance

23. If the extendable booms are never completely retracted to the transport position, the piston rods may suffer oxidation. To prevent this, completely retract the extendable booms at least once a month.

Resetting of Crane Hour Meter

24. At the completion of each annual service, reset the hour meter as follows:

- a. Remove the cover from the Paltronic 50 connection box (Figure 1, Item 4).



1	Remote control antenna box	4	Paltronic connection box
2	Paltronic 50 basic unit	5	Remote control receiver
3	Status display		

Figure 1 Crane Electrical And Remote Control Boxes

- b. Locate the green wire numbered 440 on the terminal block and bridge it to a positive supply at the opposite end of the block (Figure 2).

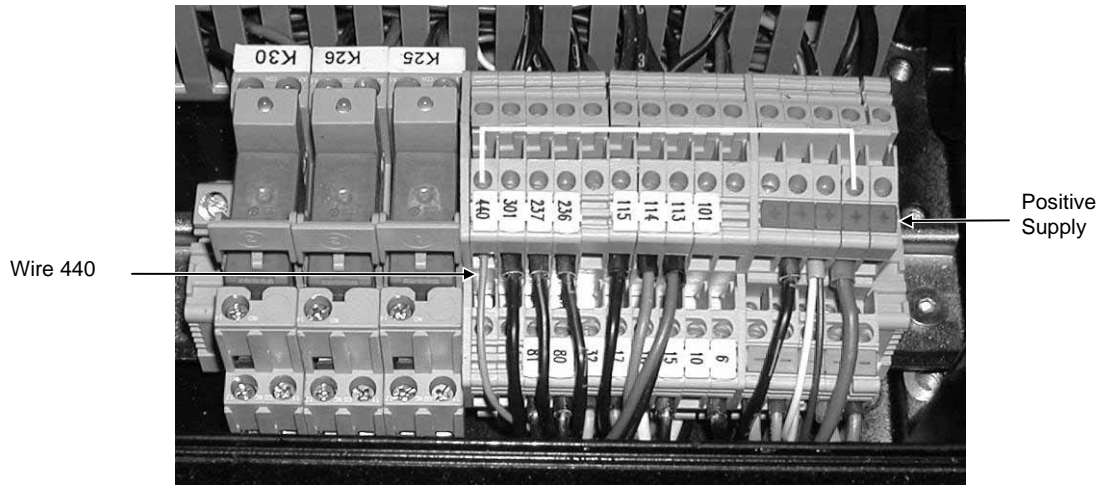


Figure 2 Resetting Crane Hour Meter

- c. Remove the bridging wire and refit the cover.

Functional Test

25. At the completion of each service, carry out a road test and a systems test to ensure that all the servicing procedures have been correctly performed and that all the systems are functioning correctly.

Constant Pull System Check

26. A constant pull system check on the winch systems is to be conducted annually IAW EMEI 329-1 miscellaneous Instruction and is conducted in conjunction with the service and technical inspection requirements of this EMEI.

Servicing Requirements and Servicing Points

Table 4 Servicing Requirements Front Power Train and Drive Line (see Figure 3)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1.	Power steering filter	N/A	R	R	-	-	1
2.	Power steering	T	D	D	OMD-115	7.75	1
3.	Front axle (differential)	T	D	D	OEP-220	11.4	1
4.	Mudguard pivots	L	L	L	XG-291	-	2
5.	Front springs (Note 1)	N/A	I	I	-	-	8
6.	Front spring shackle pins	L	L	L	XG-291	-	2
7.	Front shock absorbers (Note 1)	I,Y	I,Y	I,Y			2
8.	Steering drag link	I,L	I,L	I,L	XG-291	-	2
9.	Saltseal housing (steering box)	L	L	L	XG-291	-	1
10.	Steering shaft (2 fittings in cab)	L	I,L	I,L	XG-291	-	3
11.	Constant velocity joints	L	L	L	XG-291	-	2
12.	Front wheel bearings (Note 2)	T	D	D,I	OEP-220	-	2
13.	Front brakes (note 3)	I,A	I,A	I,O	-	-	2
14.	Upper and lower drive hub pivots	L	L	L	XG-291	-	4

Table 4 Servicing Requirements Front Power Train and Drive Line (Continued)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
15.	Steerable drive axle breathers	C	C	C	-	-	2
16.	Tie rod ends	L	L	I,L	XG-291	-	2
17.	Air cleaners	C	C	C	-	-	2
18.	Universal joints	L	L	L	XG-291	-	3
19.	Transfer case selector	L	L	L	XG-291	-	1
20.	Transfer case linkage support	L	L	L	XG-291	-	1
21.	TruckMaster air filter and DumpMaster (EXT 50) dump valve (note 4)	O,C	O,C	O,C	-	-	1
22.	Winch rope guide roller (self recovery system)	L	L	L	XG-291	-	1
23.	Dumpmaster (XD 30) automatic drain valve (fitted to wet tank) (note 4)	O,C	O,C	O,C	-	-	1
24.	Transmission air filter (note 5)	C,I	C,I	C,I	-	-	1
25.	Transmission	T	D	D	OEP 220	12.0	1
26.	Rear engine mounts (note 6)	I,Y	I,Y	I,Y	-	-	2
27.	Clutch (note 7)	I	I	I	-	-	1
28.	Clutch throw-out bearing (note 8)	L	L	L	XG-291	-	1
29.	Clutch cross shafts and linkage (note 7 & 8)	L	A,L	A,L	XG-291	-	2
30.	Engine oil filters	R	R	R	-	-	3
31.	Coolant conditioner filter	R	R	R	-	-	1
32.	Water pump housing	L	L	L	XG-291	-	1
33.	Front engine mount (note 6)	I,Y	I,Y	I,Y	-	-	1
34.	Coolant (note 9)	T	T	D	Anti-Freeze Anti-Boil	54.0	1
35.	Fan belts	I,Y	I,Y	I,Y	-	-	1
36.	Engine oil	D	D	D	OMD-115	55.3	1
37.	Front winch rope rollers (self recovery system)	L	L	L	XG-291	-	5
38.	Headlights and driving lights	I,A	I,A	I,A	-	-	4
39.	Transmission and driveline breathers (note 10)	C	C	C	-	-	2

Legend:

A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Notes:

1. Tighten in accordance with Table 2.
2. Wheel bearing oil change:
 - a. To drain (best results are obtained when the oil is warm):
 - (1) Remove the plug pipe from the outer axle drive flange.

Table 4 Servicing Requirements Front Power Train and Drive Line (Continued)

(2)	Rotate the hub until the open threaded hole is at the lowest point of rotation.
b.	To fill:
(1)	Rotate the hub until the open threaded hole is on the horizontal centre line of the axle.
(2)	Fill the hub with the lubricant, level to the threaded hole.
(3)	Install the pipe plug in the drive flange.
3.	During alternate major service, inspect the brake lining wear in accordance with EMEI Vehicle G 799-6, and overhaul the wedge brake assembly in accordance with EMEI Vehicle G 703.
4.	Service in accordance General Pneumatics (TruckMaster) Maintenance Manual.
5.	Refer to EMEI Vehicle D 324-1
6.	Engine mounts are to be inspected regularly when operating in harsh conditions. Refer to EMEI Vehicle G 703.
7.	Remove the inspection plate to inspect the clutch wear indicator located on the clutch cover assembly and to gain access to the throw-out bearing. Adjust the clutch linkage in accordance with EMEI Vehicle D 323.
8.	Do not over grease; use a low pressure grease gun only. Apply grease to the throw-out bearing until it begins to purge out of the bearing onto the transmission input shaft. Apply extra grease onto the input shaft between the throw-out bearing housing and clutch brake as well as the release yoke fingers. Note: Grease on the clutch brake friction surface will not affect the brakes stopping ability.
9.	The coolant system is to be serviced in accordance with EMEI Vehicle G 799-10 and is to be drained, flushed and refilled at each alternate major service.
10.	Driveline breathers are located near the centre of the firewall within the engine bay.

Table 5 Servicing Requirements Rear Drive Line (See Figure 4)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Fuel filters	R	R	R	-	-	2
2	Transfer case circulation filter	R	R	R	-	-	1
3	Transfer case circulation unit suction strainer	C	C	C	-	-	1
4	Transfer case magnetic plug	C	C	C			
5	Transfer case (Note 1)	D	D	D	OEP-220	9.5	1
6	Universal joints	L	L	L	XG-291		6
7	Intermediate axle (note 2 & 3)	T	D	D	OEP-220	12.0	1
8	Rear & intermediate wheel bearings	T	D	D, I	OEP-220	-	4
9	Rear brakes (note 4)	I,A	I, A	I, O	XG-291	-	4
10	Rear axle (note 2 & 3)	T	D	D	OEP-220	11.2	1
11	Pintle hook and towing eye wear surface (note 5)	I, L	I, L	I, L	XG-291 and Molybond 122L	-	2
12	Torque rods (note 6, 7 & 8)	I,Y	I,Y	I,Y	-	-	2
13	Speed limiter (note 9)	I	I	I	-	-	1

Legend:

A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Notes:

- After the initial service the transfer case oil is to be changed every 10 000 km. Ensure that the transfer case is filled to the level indicated on the dipstick by allowing approximately five minutes for the oil to drain into the lower compartment, then top up to the correct level. Run the engine for approximately five minutes to circulate oil through the oil cooler and lines, then recheck level.

Table 5 Servicing Requirements Rear Drive Line (Continued)

2.	Power divider servicing (refer to insert Figure):
a.	Power divider filler plug (intermediate axle only).
b.	Bevel gear housing filler plug.
c.	Bevel gear housing drain plug.
d.	Axle housing filler plug.
e.	Differential drain plug.
f.	Power divider drain plug (intermediate axle only).
3.	When filling the axle housings the following procedure must be followed (refer to Insert figure 4):
a.	Fill the power divider housing (a) and install the plug.
b.	Fill both bevel gear housings (b) to the filler plug hub level and install the plugs.
c.	Fill both axle housings (d) to filler plug hub level and install the plug.
d.	When checking the oil level on the housing, remove plug (d) only to check the level.
4.	During alternate major service, inspect the brake lining wear in accordance with EMEI Vehicle G 799-6, and overhaul the wedge brake assembly in accordance with EMEI Vehicle G 703.
5.	The pintle hook and towing eye wear surfaces are to be lubricated daily with lubricant Dry Film, Molybdenum Disulphide (Powder Aerosol), NSN 9150-66-017-9404, (Molybond 122L). While towing, pintle hook and towing eye contact areas are to be lubricated using Molybond 122L every 150 km, or more frequently if required
6.	Torque rod to mounting plate nut torque specification – 880 N.m.
7.	Torque rod mounting plate bolt ¾ inch by 2 inch Ig UNC (horizontal) torque specification – 440 N.m.
8.	Torque rod to mounting plate bolt 5/8 inch by 3¼ inch Ig UNF (vertical) torque specification – 189 N.m.
9.	Carry out a function test of the speed limiter in accordance with EMEI Vehicle D 323. Note: The speed limiter is only to be adjusted by Mack Trucks (Aust) in accordance with EMEI Vehicle D 324-2.

Table 6 Servicing Requirements Air Spring Suspension System (SA441W) (See Figure 5)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Rear shock absorbers (note 1)	I,Y	I,Y	I,Y	-	-	4
2	Transverse beam (note 2)	I,Y	I,Y	I,Y	-	-	2
3	Air springs and air leaks (note 3, 4 & 5)	I,C	I,C	I,C	-	-	4
4	Equalising beam pivot bolts and bushes (Note 6)	I,Y	I,Y	I,Y	-	-	4
5	Equalising beam frame hanger brackets (Note 7 & 8)	I,Y	I,Y	I,Y	-	-	4
6	Equalising beam	I	I	I	-	-	4
7	Equalising beam to chassis frame brackets (Note 9 & 10)	I,Y	I,Y	I,Y	-	-	4
8	Dump valve	I	I	I	-	-	1
9	Height control valve and filter screen (Note 11)	I,C	I,C	I,C	-	-	2
10	Air suspension filter	R	R	R	-	-	1
11	Pressure protection valve and filter (Note 12)	I,C	I,C	I,C	-	-	1
12	Inversion valve	I	I	I	-	-	2

Legend:

A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Table 6 Servicing Requirements Air Spring Suspension System (SA441W) (Continued)

Notes:	
1.	Shock absorber mounting nuts ¾ inch torque specification – 149 N.m
2.	Tension castellated nuts and then continue to align slot for roll pin (there should be no movement in washers) – torque specification 271 N.m
3.	Vehicle on level ground, air bags to be of equal firmness and air pressure is to be above 448 kPa.
4.	Air spring mounting nuts and bolts ½ inch and ¾ inch torque specification – 47 N.m
5.	Minimum clearance – 44.5 mm.
6.	Replace when bushes are replaced. Standard 1-1/8 inch pivot nuts torque specification – 813 N.m.
7.	Bolt and nut (fine thread) torque specification – 1084 N.m.
8.	Bolt and nut (course thread) torque specification – 271 N.m.
9.	Equalising beam to chassis frame bracket ¾ inch bolts – 271 N.m.
10.	Lower flange of frame to be securely attached to cross-member by bolts
11.	Ensure valves are free of mud and foreign objects. Adjust as necessary. Refer to EMEI Vehicle G 703-1. To be within ± 6.5 mm.
12.	Replace when air flow is substantially restricted

Table 7 Servicing Requirements Recovery Equipment (See Figure 6)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Hydraulic reservoir	I	D	D	OM-68	150.0	
2	Hydraulic filters	R	R	R	-	-	
3	Fuel tank (note 1)	I	I	I	Diesel	530.0	1
4	Control valve regulator/ lubricator (note 2)	I,C,A	I,C,A	I,C,A	-	-	1
5	Air system filter	C	C	C	-	-	1
6	Lift cylinder pins (note 3)	L	I,L	I,L	XG-291	-	1
7	Spade cylinder pins upper and lower (note 3)	L	L	L	XG-291	-	4
8	Fairlead pivot tubes	I, L	I, L	I, L	XG-291	-	2
9	Fairlead sheaves (note 3 & 6)	L	I, L	I, L	XG-291	-	2
10	Towing pivot head (note 3 & 4)	C, I, L	C, I, L	C, I, L	XG-291	-	8
11	Tow cylinder pins (note 3)	L	I, L	I, L	XG-291	-	2
12	Rope tensioners (note 6)	I,L	I,L	I,L	XG-291	-	2
13	Self recovery sheave (note 3 & 6)	L	I, L	I, L	XG-291	-	1
14	Control lever bushes	L	L	L	XG-291	-	7
15	Rope tensioner regulators (note 7)	I	I	I	-	-	2
16	Cat walk hold open latch	L	L	L	XG-291	-	
17	Reversing sheaves (note 6 & 8)	I, L	I, L	I, L	XG-291	-	
18	Recovery module general inspection and servicing (note 9 & 10)	I	I	I	-	-	

Legend:

A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Table 7 Servicing Requirements Recovery Equipment (Continued)

Notes:	
1.	On minor and major services, the fuel tank drain cock is to be opened slightly to allow any water to drain. Close the drain cock on completion.
2.	Inspect and adjust in accordance with EMEI Vehicle D 323. Pressure setting – 5.5 to 6.2 bar. Ensure the air system is drained prior to removal of the lubricator reservoir.
3.	During Major and alternate major service, remove, clean and inspect all pins and bushes for wear in accordance with EMEI Vehicle D 323.
4.	During each service the pivot head assembly is to be removed, cleaned and inspected.
5.	The spade legs will need to be extended to access the grease nipples for the bottom pins.
6.	Rotate all sheaves while greasing.
7.	Ensure pressure setting is 6.8 to 7.5 bar.
8.	Inspect the condition of the reversing sheave pins. If the chrome plating shows any sign of degradation the pin must be replaced.
9.	Visually inspect for cracking of components paying particular attention to welds. Areas to be inspected include the following,:
a.	tow hitch components,
b.	tow hitch mounting points,
c.	reversing sheave frames,
d.	winch fairlead assemblies,
e.	anchor point mounts,
f.	self recovery sheave housing, and
g.	safety chain housing chain anchor points.
10.	General servicing of the recovery module is to include lubrication of all hinges pins and linkages not fitted with grease nipples.

Table 8 Servicing Requirements Winches (See Figure 7)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Pneumatic disengagement cylinder and engaging bores (note 1)	I, C, L	I, C, L	I, C, L	Rubber grease	-	2
2	Winch ropes, drum and rope wedge (note 2 & 3)	I,C, L	I,C, L	I,C, L	Rocol or equivalent SWR lubricant	4 x 500g aerosol cans per service	2
3	Winch gear drain (note 4)	I	I	I	Antiseize	-	1
4	Winch pressure plate	I	I	I	-	-	2
5	Winch drag brake (small, manual) (note 6)	I, A	I, A	I, A	-	-	1
6	Winch V ring (note 7)	C,I	C,I	C,I	-	-	2
7	Calibration (note 8)	N/A	I, A	I, A	-	-	2

Legend:

A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Notes:

1. Dismantle and lubricate in accordance with EMEI Vehicle D 323. Inspect the edges of the bores for damage and wear to ensure the pin will engage smoothly and completely.
2. Pull ropes out and inspect in accordance with EMEI Vehicle D 108. **Note:** It is not necessary to carry out Winch Set-up and Constant Pull System Check (refer to EMEI Vehicle D 329-1) when replacing ropes unless the integrity of the system is in question

Table 8 Servicing Requirements Winches (Continued)

3.	Inspect rope and wedge for correct fitment and security only
4.	Remove drain plug to drain moisture build up. The left hand winch drain plug can be accessed via the inspection plate located above the rear wheels and the right hand plug can be accessed from under the vehicle
5.	Inspect pressure plate for wear or sharp edges that could damage the rope.
6.	Adjust in accordance with EMEI Vehicle D 323.
7.	Check that the V ring is in place and in servicable condition.
8.	The Winch Set-up and Constant Pull System Check detailed in EMEI Vehicle D 329-1 is to be conducted at every Major and Alt Maj Service.

Table 9 Servicing Requirements Crane (See Figure 8)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Linkage system (note 1)	L	L	L	XG-291	-	4
2	Main boom lift cylinder centre pivot (note 1)	L	L	L	XG-291	-	2
3	Outer boom cylinder pivot (note 1)	L	L	L	XG-291	-	1
4	Boom bushes (note 1)	L	L	L	XG-291	-	1
5	Boom extension (note 1)	L	L	L	XG-291	-	1
6	Boom extension wear pads (note 2)	I	I	I		-	4
7	Crane pillar bearing and slew gear (note 3)	L	L	L	XG-291	-	3
8	Stabiliser control levers and shift rods	L	L	L	OMD-115	-	1
9	Hour meter (note 3)	A	A	A	-	-	1
10	Main control levers	L	L	L	OMD-115	-	1
11	Hydraulic filter (note 4)	R	R	R	Antiseize	-	1
12	Base mounting shackle bolts (note 5)	Y	Y	Y	-	-	6
13	Hook (note 6)	I, L	I, L	I, L	OMD-115	-	1
14	Tamper evident seals (note 7)	I	I	I			3

Legend:

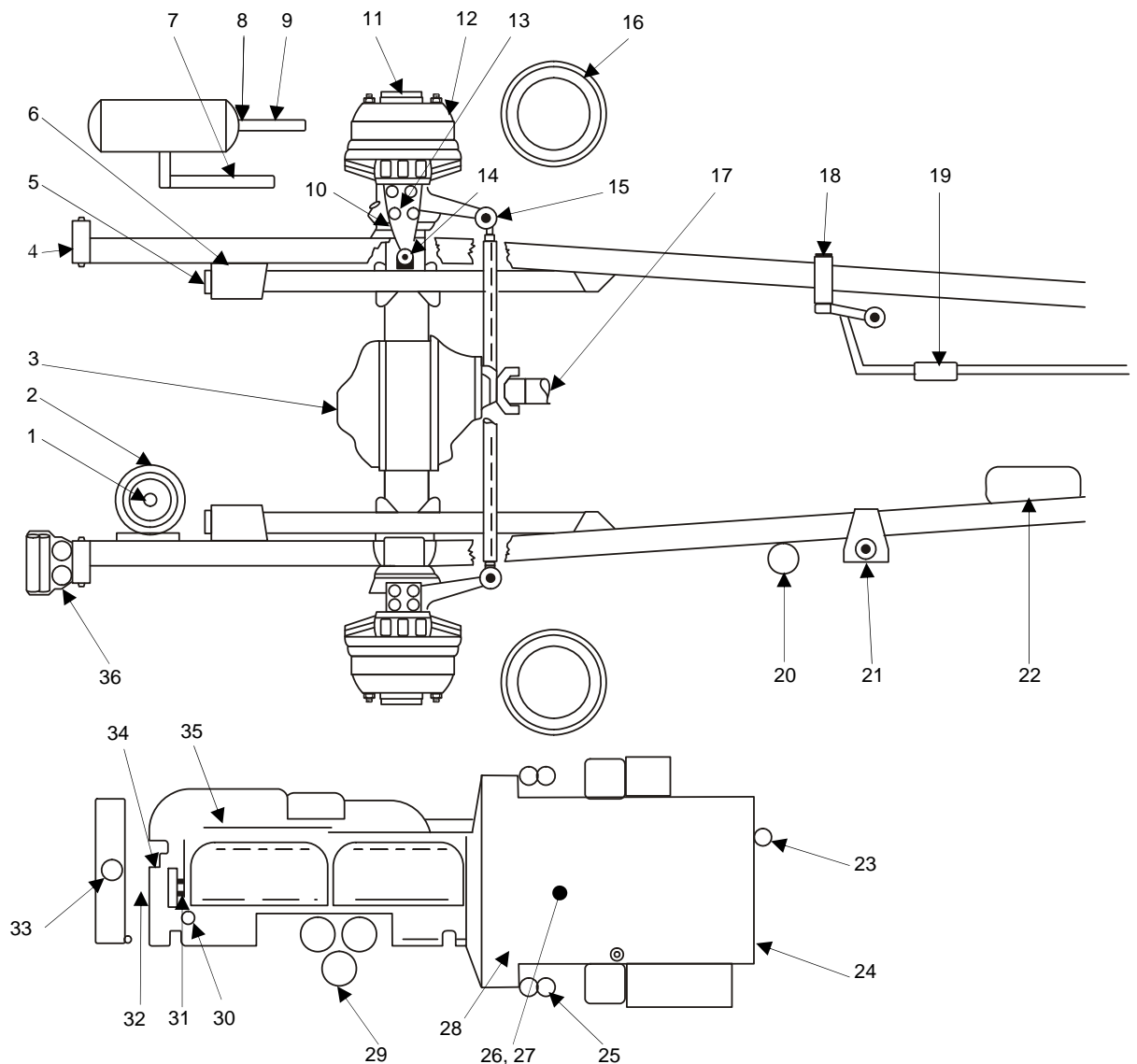
A – Adjust, **AR** – Action Required, **B** – Bleed, **C** – Clean, **D** – Drain and Refill, **I** – Inspect and or Correct, **L** – Lubricate, **N/A** – No Action, **O** – Overhaul, **R** – Replace, **T** – Check and Top Up, **Y** – Tighten/Free Up, **W** - Record

Notes:

- Lubricate in accordance with instructions listed at Para 20.
- Extend boom out and inspect condition of wear pads and keepers. Ensure all screws are in place and secure. Measure clearance between the wear pad and boom, replace wear pads in accordance with EMEI Vehicle D 324-1 if the clearance is more than 4 mm. Lower the boom until it rests on the ground to check the condition of the bottom plastic guide blocks, replace if necessary.
- Reset hour meter at completion of each annual service in accordance with Para 24.
- Apply antiseize to the threads of the filter housing.
- Tighten in accordance with specification listed at Table 3. **Re-torque after initial 50 hours of operation.**
- Inspect the hook condition including the function and condition of safety flap.
- Ensure tamper evident seals on load holding valves and crane override valve are in place. Crane will require calibration if valve settings have been adjusted.

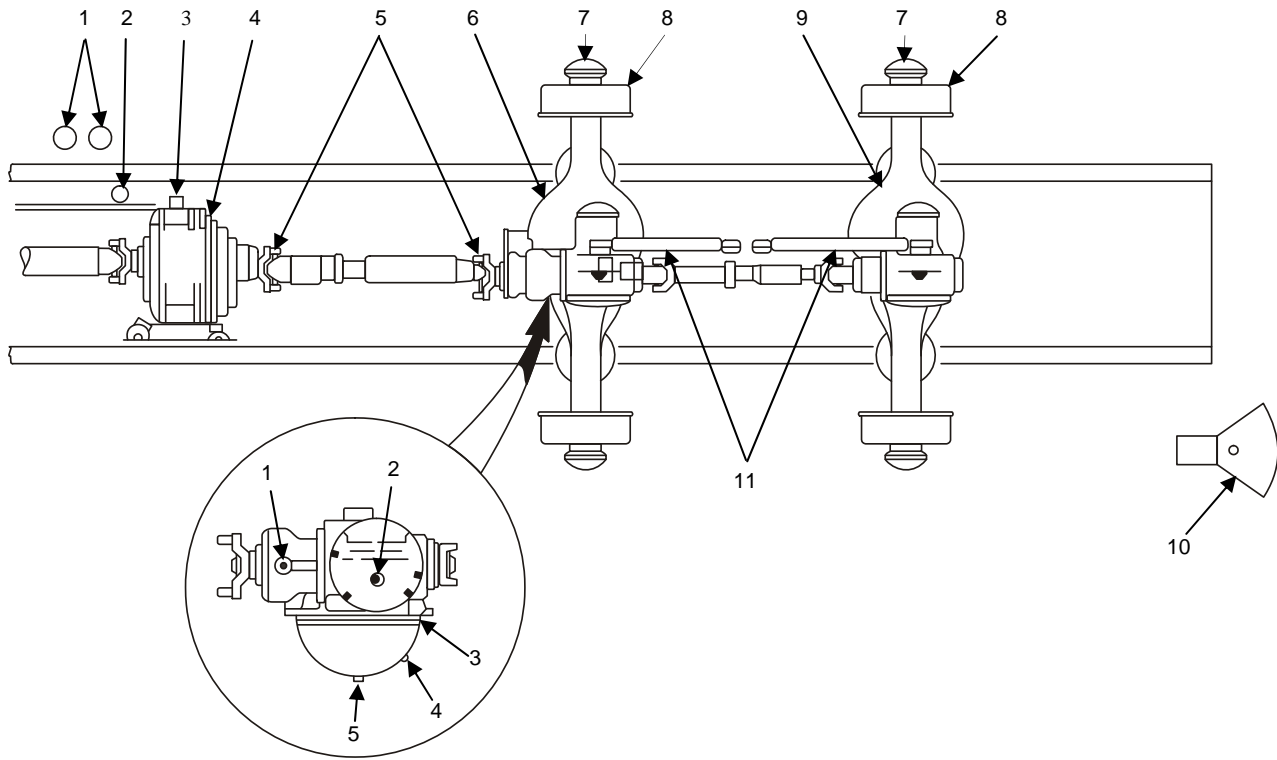
Table 10 Servicing Requirements Air-conditioning (See Figure 9)

Serial	Item or Assembly	Minor Service 12 mths/ 20 000 km	Major Service 24 mths/ 40 000 km	Alt Maj Service 48 mths/ 80 000 km	Lubricant	Capacity (Litres)	No of Points
1	Fresh air intake filter (note 1)	C	C	C	-	-	1
2	Return air filter	C	C	C	-	-	1
3	Evaporator drain tube	C, I	C, I	C, I	-	-	1
4	Receiver dryer	N/A	R	R	-	-	1
5	Condenser coil	C	C	C	-	-	1
6	Compressor drive belt	I, A	I, A	I, A	-	-	1
7	Compressor Oil (note 2 & 3)	N/A	D	D	Sanden SP-20	135 ml	1
8	Hoses & Pipes	I	I	I	-	-	-
9	Refrigerant (note 2)	I	R	R	R134a	1.2 kg ± 50 g	-
10	Operation of the system (note 4)	AR	AR	AR			
<p>Legend: A – Adjust, AR – Action Required, B – Bleed, C – Clean, D – Drain and Refill, I – Inspect and or Correct, L – Lubricate, N/A – No Action, O – Overhaul, R – Replace, T – Check and Top Up, Y – Tighten/Free Up, W - Record</p>							
<p>Notes:</p> <ol style="list-style-type: none"> 1. Located in rear of roof rack. 2. For maintenance and adjustment procedures, refer to the Crisp-Air Air Conditioning Handbook. 3. Recover refrigerant gas, change compressor oil and receiver dryer, flush the system, recharge the system and check for leaks. 4. Run the air conditioner for 15 minutes at full capacity and check the level of refrigerant in the system. Check evaporator return air temperature to ensure proper operation. Any repairs required on the system are to be carried out in accordance with EMEI Vehicle G 794-1. 							



- | | | |
|--------------------------------------|------------------------------------|------------------------------|
| 1. Power Steering Filter | 2. Power Steering | 3. Front Axle |
| 4. Mudguard Pivots | 5. Front Springs | 6. Front Springs Shackle Pin |
| 7. Steering Drag Link | 8. Steering Box | 9. Steering Shaft |
| 10. Constant Velocity Joints | 11. Front Wheel Bearings | 12. Front Brakes |
| 13. Upper and Lower Drive Hub Pivots | 14. Steerable Drive Axle Breathers | 15. Tie Rod Ends |
| 16. Air Cleaners | 17. Universal Joints | 18. Transfer Case Selector |
| 19. Transfer Case Linkage Support | 20. DumpMaster (EXT 50) | 21. Winch Rope Guide Roller |
| 22. DumpMaster (XD 30) | 23. Transmission Air Filter | 24. Transmission |
| 25. Rear Engine Mounts | 26. Clutch | 27. Clutch Throw-out Bearing |
| 28. Clutch Cross Shafts and Linkage | 29. Engine Oil Filters | 30. Water Conditioner |
| 31. Water Pump Housing | 32. Front Engine Mount | 33. Coolant |
| 34. Fan Belts | 35. Engine Oil | 36. Front Winch Rollers |

Figure 3 Servicing Points For Front Power Train And Drive Line



- | | | |
|---------------------------------------|-------------------------------------|-----------------------------------|
| 1. Fuel Filters | 2. Transfer Case Circulation Filter | 3. Transfer Case Suction Strainer |
| 4. Transfer Case | 5. Universal Joints | 6. Intermediate axle |
| 7. Intermediate & Rear Wheel Bearings | 8. Intermediate & Rear Brakes | 9. Rear Axle |
| 10. Pintle Hook | 11. Torque Rods | |

Insert

- | | | |
|--|---|----------------------------------|
| 1. Power Divider Filler Plug
(intermediate axle only) | 2. Bevel Gear Housing Filler Plug | 3. Bevel Gear Housing Drain Plug |
| 4. Differential Drain Plug | 5. Power Divider Drain Plug
(intermediate Axle Only) | |

Figure 4 Servicing Points Rear Drive Line

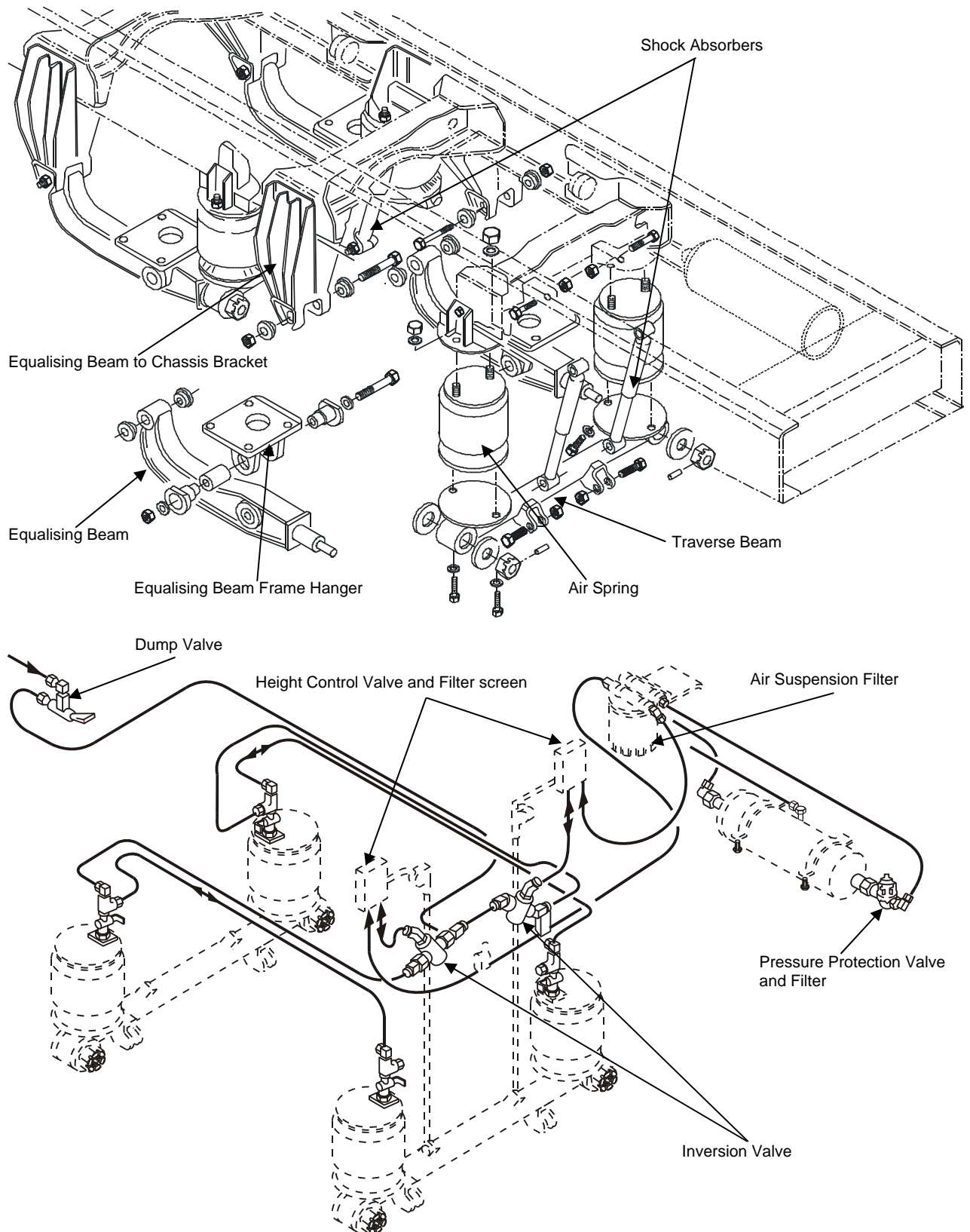


Figure 5 Servicing Points For Air Spring Suspension System (SA441W)

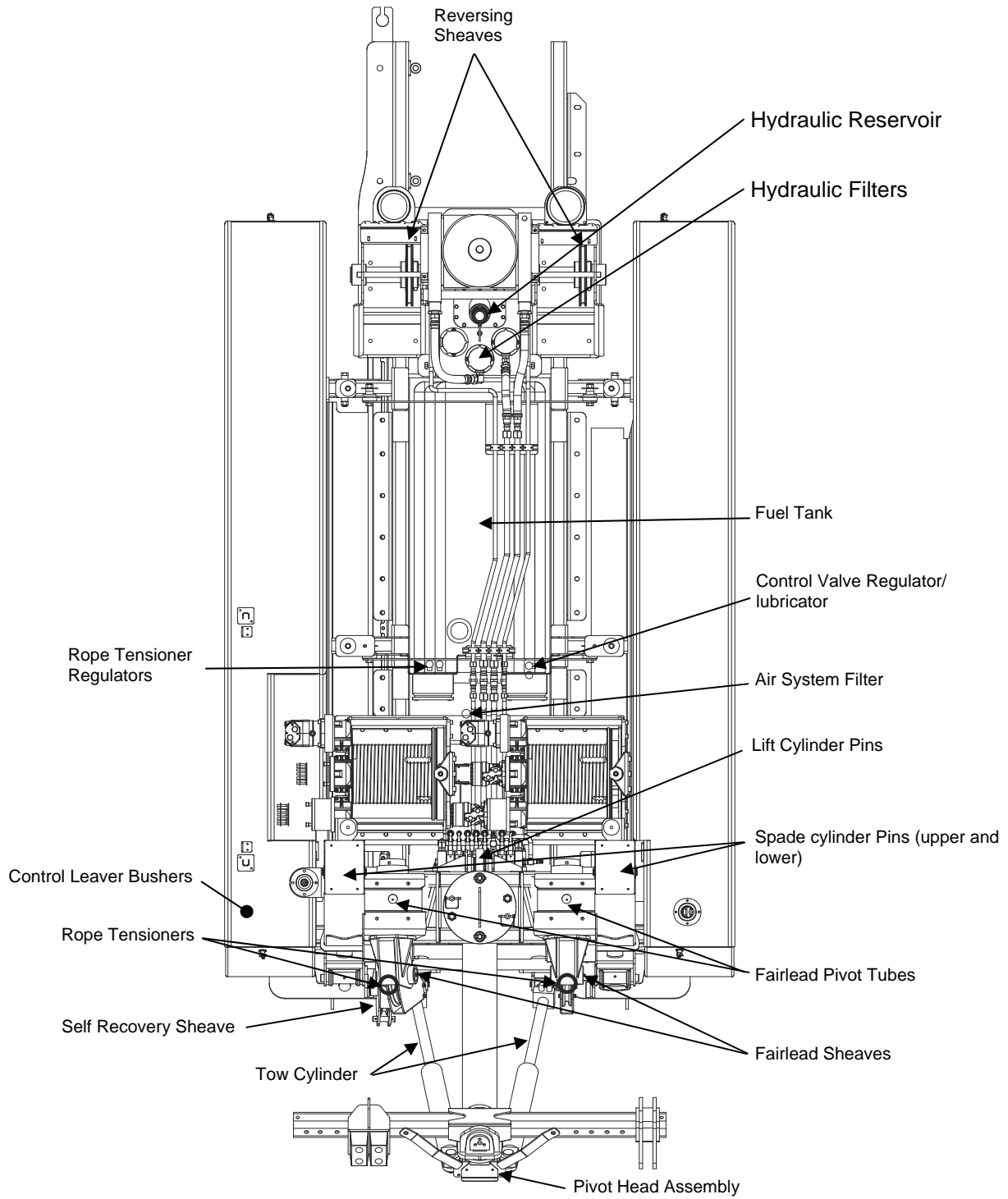


Figure 6 Servicing Points Recovery Equipment

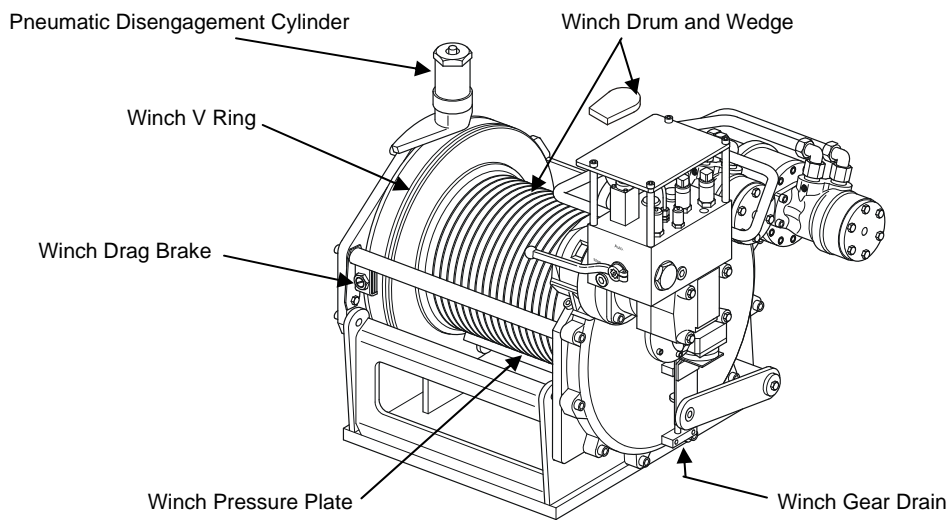


Figure 7 Servicing Requirements Points Winches

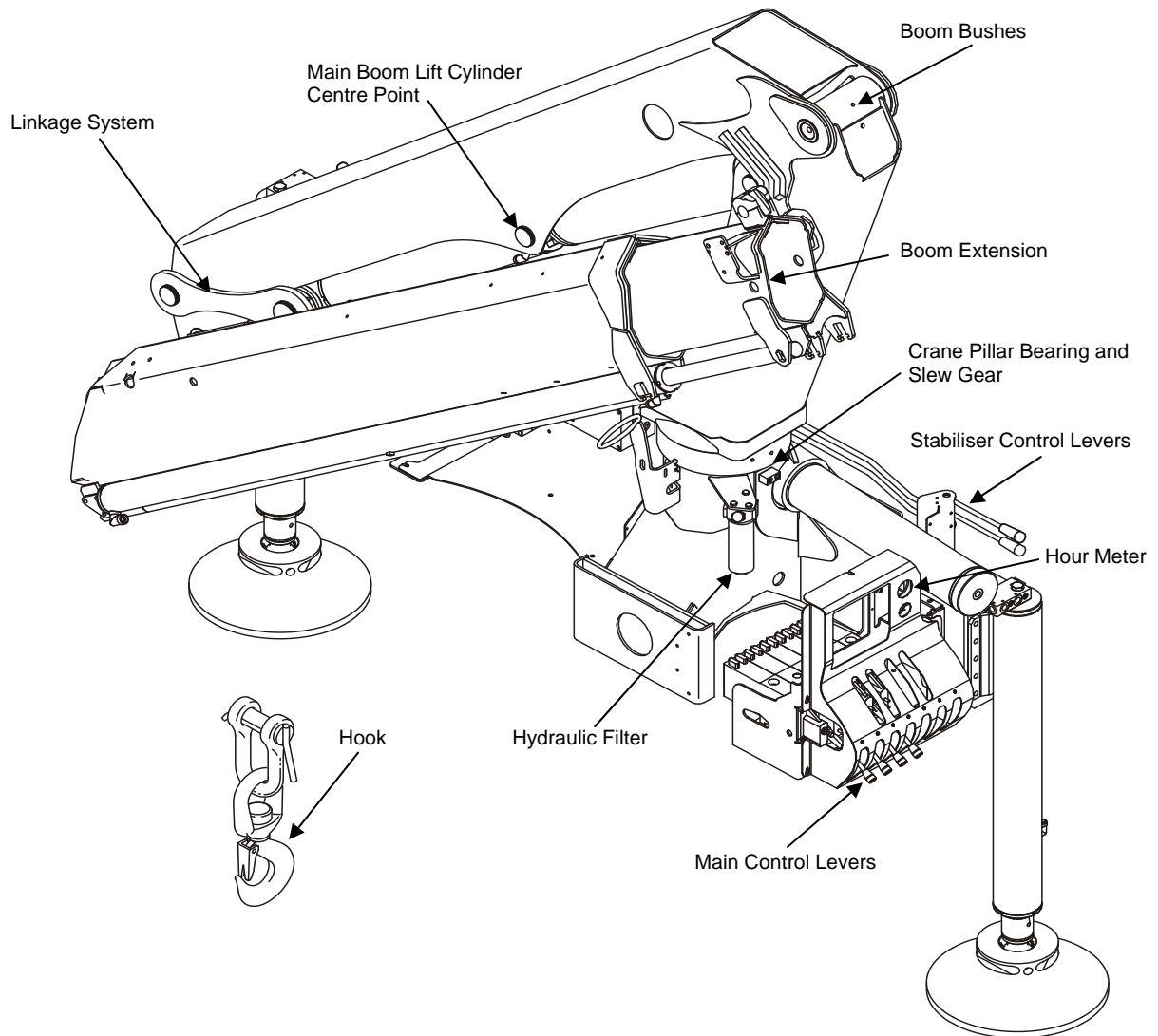


Figure 8 Servicing Requirements Crane

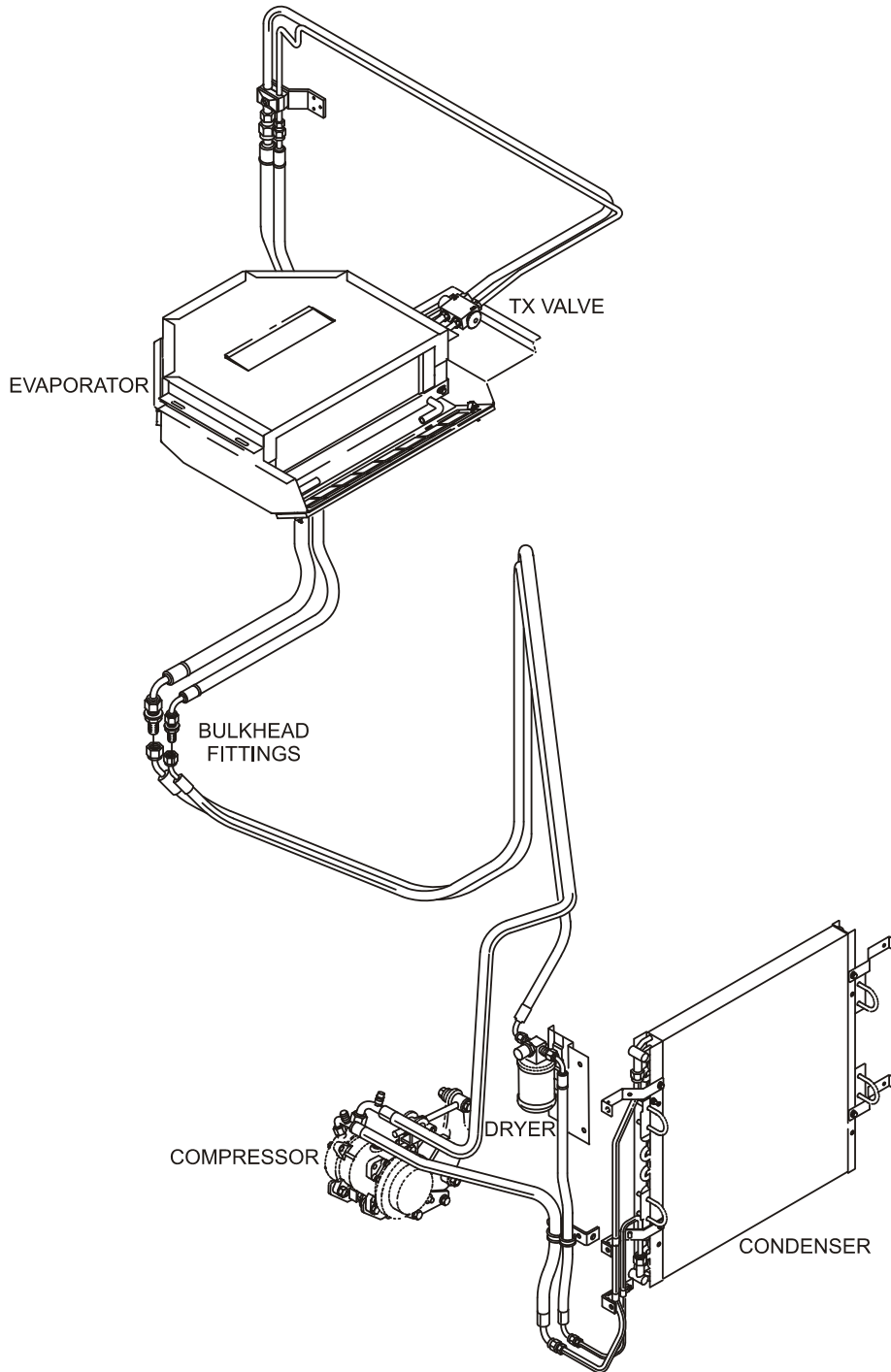


Figure 9 Air Conditioner System

END

Distribution List: **VEH D 30.0 – Code 2** (Maint Code)
(Sponsor: CGSV SPO MDM/HVY B VEH)
(CGSVSPO EC-003829)