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

WARNING

DRAIN AIR FROM THE TRUCKS AIR SYSTEM PRIOR TO REMOVAL OF AIR LINES OR AIR SYSTEM COMPONENTS.

DISCONNECT THE VEHICLE BATTERIES AND REMOVE BOTH PLUGS FROM THE WINCH PROGRAMMABLE LOGIC CONTROLLER (PLC) BOXES PRIOR TO COMMENCING ANY WELDING TASKS.

THE ENGINE, CLUTCH, TRANSMISSION AND BODY COMPONENTS OF THIS VEHICLE HAVE BEEN SIGNIFICANTLY MODIFIED FROM THE STANDARD CONFIGURATION OF MACK R SERIES FLEET VEHICLES. IT IS THEREFORE IMPERATIVE THAT INSTRUCTIONS DETAILED IN THIS EMEI ARE STRICTLY FOLLOWED TO PREVENT THE PERFORMANCE OF INCORRECT MAINTENANCE PROCEDURES.

1. This EMEI supplement contains medium repair level instructions for removing, repairing, replacing and installing components fitted to the Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778 as shown in Figure 1. For further information on the base truck refer to the relevant references.

ASSOCIATED PUBLICATIONS

2. For technical data pertaining to the base truck, repair procedures and other relevant information, reference may be necessary to the latest issue of the following documents:

   a. EMEI Vehicle D 320 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778 – Data Summary;
   b. EMEI Vehicle D 322 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778 – Technical Description;
   c. EMEI Vehicle G 702 – Truck, Cargo, Heavy, MC3, (Mack) – Technical Description;
   d. EMEI Vehicle G 702-1 – Truck, Cargo, Heavy, MC3, (Mack), All Types, Air Spring Suspension System (SA441W) – Technical Description;
   e. EMEI Vehicle D 323 – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778 – Light Repair;
   f. EMEI Vehicle G 703 – Truck, Cargo, Heavy, MC3, (Mack) – Unit Repair;
3. Refer to the following publications for safety of personnel and prevention of damage to equipment:
   a. EMEI Workshop E series – Occupational Health and Safety Instructions;
   b. Defence Safety Manual, Volumes 1 and 2;
   c. Product Material Safety Data Sheets (MSDS) – product information sheets;
   d. Relevant Equipment EMEI Servicing Instructions;
   e. Technical Manual User Handbook (Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778); and

**ROTABLE ITEM IDENTIFICATION**

4. Table 1 identifies and lists the locations of rotatable items.

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<td>Chassis No.</td>
<td>Right hand rear frame, above intermediate axle.</td>
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<tr>
<td>Engine No.</td>
<td>Right hand top of timing gear housing</td>
</tr>
<tr>
<td>Fuel injection pump</td>
<td>Side of pump</td>
</tr>
<tr>
<td>Front axle No.</td>
<td>Left rear of axle housing</td>
</tr>
<tr>
<td>Transmission No.</td>
<td>Right rear of auxiliary housing</td>
</tr>
<tr>
<td>Transfer case No.</td>
<td>Right hand rear</td>
</tr>
<tr>
<td>Intermediate axle No.</td>
<td>Right hand front of carrier housing</td>
</tr>
<tr>
<td>Rear axle No.</td>
<td>Right hand front of carrier housing</td>
</tr>
<tr>
<td>Crane PTO</td>
<td>Plate on PTO housing</td>
</tr>
<tr>
<td>Miller recovery unit</td>
<td>Plate on inner side of right hand spade housing</td>
</tr>
<tr>
<td>Winches</td>
<td>Plate affixed to motor side of winch housing</td>
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**SPECIAL TOOLS AND GAUGES**

5. The following special tools, gauges and apparatus are required as indicated to perform the tasks detailed within this EMEI:
   a. Solo clutch tool part No EA10383 (refer to Table 2). See Figure 2.
b. Transmission jack part No 5019 (refer to Para 33). See Figure 3.

Figure 3 – Transmission Jack

c. Load cell with a minimum working capacity of 13 tonnes (refer to Para 116). An example is shown at Figure 4.

Figure 4 – Load Cell
d. Hydraulic pressure gauge (refer to Para 116) Daimler Chrysler Australia Pacific P/No. YA4375690000 0 to 250 bar to fit the test point on the winch hydraulic block.

PNEUMATIC FAN CLUTCH

**WARNING**

TO PREVENT PERSONAL INJURY, STOP ENGINE AND ENSURE THAT THE FAN HAS STOPPED TURNING BEFORE APPROACHING THE FAN AREA.

8. **Removal and Installation.** Removal and installation of the fan clutch is to be conducted in accordance with EMEI Vehicle D 323.

9. **Disassembly.** To disassemble the fan clutch, proceed as follows (refer to Figure 5):

   a. Remove the six socket head cap screws from the front of the air chamber then remove and discard the two shoulder screws.

   b. Separate the air chamber and piston from the drive sleeve.

   c. Remove and discard the two silicone sleeves, compression springs and seal washers.

   d. Separate the air chamber and piston and discard the piston and ‘O’ ring.

   e. Remove the pan head screws, retaining washer, rotary air union and ‘O’ ring from the air chamber.

   **NOTE**

   If not replacing the drive sleeve or friction disc disregard Paras 9f and g.

   f. Remove the hex head cap screw and washer then slide the mounting off the splined hub of the friction disc.

   g. Slide the friction disc out of the drive sleeve.

10. **Cleaning and Inspection.** To clean and inspect the fan clutch, proceed as follows:

   a. Prior to any cleaning inspect the inside of the air chamber for any signs of dirt or foreign material. The air chamber should be relatively clean and dry. If not a problem may exist within the vehicles air system and must be corrected prior to reinstalling the fan clutch.

   b. Clean the ‘O’ ring contact surfaces of the air chamber and piston using clean solvent.

   c. Check that the rotary air union spins freely and smoothly. If not it must be replaced.
d. Inspect the condition of the friction disc and
replace if less than 1.6 mm thick, oil spotted
or has visible burn marks.

e. Inspect the condition of the bearing in the
drive sleeve. Replace the drive sleeve if the
bearing is unserviceable.

f. Inspect all other components for wear and
damage, replace as required.

11. Assembly. To assemble the fan clutch, proceed
as follows:

   a. Lubricate the new ‘O’ ring and ‘O’ ring
contact surfaces of the air chamber with
pneumatic grease (supplied in repair kit).

   b. Press the new piston into the air chamber.

   NOTE

   If not replacing the drive sleeve or friction disc
   proceed to Para 11e.

   c. Slide the friction disc into the new drive
   sleeve.

   d. Slide the mounting bracket onto the splined
   hub of the friction disc apply a drop of
Locitite 242 to the thread of the hex head cap
screw install and tighten.

   e. Install two new silicone sleeves over the
new compression springs and fit to the drive
sleeve.

   f. Place new seal washers on top of the
compression springs.

   g. Align the piston with the tabs of the drive
sleeve, apply a drop of Locitite 242 to the
threads of each new shoulder screw and
secure the air chamber and new piston to the
drive sleeve.

   h. Alternately and evenly torque the shoulder
screws to 27 to 34 N.m.

   i. Apply a drop of Locitite 242 half way down
the threads of the six socket head capscrews
and insert.

   j. Alternately and evenly torque the six socket
head cap screws to 27 to 34 N.m.

   k. Lubricate the rotary air union ‘O’ ring with
pneumatic grease and install into the air
chamber.

---

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Figure 5 – Horton Fan Hub HT650
GROUP 4 – FUEL SYSTEM

12. For maintenance procedures related to fuel system components not contained in this EMEI, refer to the following:
   a. EMEI Vehicle G 703,
   b. EMEI Vehicle G 704, and
   c. EMEI Vehicle G 704-1.

FUEL TANK

13. **Removal.** To remove the fuel tank, proceed as follows:
   a. Remove the access panels above the fuel tank.
   b. Disconnect plug and remove the hydraulic pipes above the fuel tank.
   c. Remove the cross braces. Take care when removing the rear brace so as not to damage the air manifold or lines.
   d. Drain the fuel from the tank into an appropriate storage container through the bottom drain tap and extension hose.
   e. Disconnect the extension hose after draining and close the drain tap.
   f. Disconnect the fuel sender wiring and fuel lines from the tank. Cover the ends of the fuel lines to prevent entry of contaminants.
   g. Remove the bolts securing the fuel tank mounts to the sub frame.
   h. Attach appropriate lifting slings to the tank and lift it clear of the well.

14. **Installation.** Install the fuel tank in reverse order to removal then, after refuelling inspect all connections for leaks.

---

**NOTE**

The clutch resetting procedures detailed in Paras 18a to e are only to be followed if the existing clutch is to be refitted. If the clutch is unserviceable, commence the removal procedure at Para 18d.
a. Remove the inspection plate from the base of the clutch housing and have an assistant fully depress the clutch pedal and hold it down.

b. Slide the wear indicator tab to the left until it reaches the NEW position.

**NOTE**
The wear indicator tab should move with finger pressure (see Figure 7). Do not attempt to move the tab by striking or prying. If the tab is seized in place, not in the REPLACE position and will not move using finger pressure, the clutch must be replaced.

c. Remove foot from the clutch pedal, the tab will stay in its new position.

d. Remove the transmission in accordance with Para 33.

e. Install four 7/16 inch × 1-3/4 inch long UNC machine screws, one turn only after they contact the cover at the locations shown in Figure 8.
f. Install a clutch aligning tool.

g. Securely support the clutch, remove the screws securing it to the flywheel and remove the assembly. Ensure the discs and intermediate plate do not drop out as the assembly is removed.

h. Remove the spigot bearing from the flywheel.
19. **Cleaning and Inspection.** To clean and inspect the clutch and housing, proceed as follows:

**CAUTION**

FAILURE TO PERFORM THE FOLLOWING INSPECTION PROCEDURE AND FAILURE TO CORRECT ANY MISALIGNMENT EXCEEDING THE SPECIFIED LIMITS WILL RESULT IN CLUTCH FAILURE AND WEAR TO DRIVELINE COMPONENTS.

- **a.** Thoroughly clean the surfaces of the flywheel and flywheel housing using solvent or warm soapy water to enable accurate measurements to be taken.

- **b.** If the existing clutch is to be re-used, clean all components using warm soapy water.

- **c.** Secure a dial indicator to the flywheel housing as shown in Figure 9, with the gauge finger on the machined surface as close to the outer edge of the flywheel as possible.

- **d.** Rotate the flywheel one revolution and mark the high spots. The difference between the two spots should not exceed 0.2 mm.

- **e.** Leaving the dial indicator secured to the flywheel housing, move the gauge finger to contact the surface of the spigot bearing bore as shown in Figure 10. Rotate the flywheel one full turn, marking the high and low spots as you go. The total difference between the high and low spots should not exceed 0.2 mm (refer to Figure 12).

**Figure 8 – Shipping Screw Locations**

**Figure 9 – Flywheel High Spots**

**Figure 10 – Spigot Bore Runout**
h. Visually inspect the input shaft for damage and wear, then slide a new clutch disc along the shaft to check for twisting. Replace the shaft in accordance with EMEI Vehicle D 324-2 if the disc does not move freely or if the smooth area of the shaft is rough or scored.

i. Inspect the mating surfaces of the clutch and flywheel housings. Housings will need to be replaced if any appreciable wear is evident as this will cause misalignment. Most wear will occur between the 3 and 8 o’clock positions.

j. Inspect the cross shafts Figure 13(A) and bushings for wear. Excessive wear at these points may cause a side loading condition onto the sleeve bushing of the new clutch which may cause the bushing to walk out of the sleeve. Inspect all other pivot points of the linkage and replace worn items.

k. Inspect the transmission front bearing cover surface Figure 13(E). A worn or rough cover may cause premature clutch brake wear.

Figure 13 – Cross Shaft Inspection

l. Inspect the release yolk fingers Figure 13(B) for wear. Excess wear of the fingers may prevent the linkage from obtaining sufficient clutch brake squeeze.

20. Installation. To install the clutch, proceed as follows:

**WARNING**

THE CLUTCH ASSEMBLY WEIGHS 68 KG. APPROPRIATE MHE SHOULD BE USED TO SUPPORT THE ASSEMBLY DURING REMOVAL AND INSTALLATION.

a. Install a new clutch brake assembly onto the input shaft.

b. Fit two 7/6 inch × 5 inch long UNC guide studs into the two upper mounting holes of the flywheel.

c. Insert the aligning tool through the release bearing sleeve of the new clutch.

d. Fit one clutch disc onto the aligning tool with the stamp ‘INTERMEDIATE PLATE SIDE’ facing the intermediate plate.

e. Install the intermediate plate into the four slots of the clutch cover with the stamp ‘FLYWHEEL SIDE’ facing the flywheel.

f. Fit the second driven disc onto the aligning tool with the stamp ‘INTERMEDIATE PLATE SIDE’ against the intermediate plate.

g. Position the clutch over the two guide studs and slide it forward until contact is made with the flywheel surface.
NOTE
Be sure that the aligning tool pilot is inserted into the pilot bearing. Failure to do this may result in the driven discs not being centered, causing difficult transmission installation.

h. Start six mounting bolts with lock washers and tighten them finger tight. Remove the two guide studs and replace them with the two remaining mounting bolts and lock washers.

CAUTION

FAILURE TO TIGHTEN THE CLUTCH COVER MOUNTING BOLTS IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS MAY PREVENT THE CLUTCH COVER FROM CENTERING INTO THE PILOT AREA OF THE FLYWHEEL. IT MAY ALSO CAUSE DAMAGE TO THE CLUTCH COVER AND/OR PRODUCE AN OUT OF BALANCE SITUATION.

i. Starting with the lower left hand bolt, progressively tighten the eight mounting bolts in the order shown in Figure 14 until a final torque of 54 to 68 N.m is reached.

Figure 14 – Clutch Bolting Procedure

j. Remove the four yellow coloured shipping bolts in a criss-cross pattern.

NOTE
Save these four bolts for future use in case you need to remove then reinstall the Solo clutch.

k. Remove the aligning tool then, using a 6 mm diameter flat nose punch, lightly tap each of the four positive separator pins toward the flywheel. Performing this step will verify that all four pins are flush against the flywheel. The pins can be set through the inspection opening of the clutch housing if they were not to set prior to transmission installation.

l. Install the transmission in accordance with Para 36.

CAUTION

DO NOT USE THE WEAR INDICATOR TAB TO ADJUST OR ATTEMPT TO ADJUST THE CLUTCH UNLESS INSTRUCTED BY A PROCEDURE DETAILED WITHIN THIS EMEI.

21. Clutch Linkage Adjustment. With the transmission re-installed in accordance with Para 36 perform the following steps:

a. Remove the inspection plate from the base of the clutch housing and have someone fully depress the clutch pedal and hold it down.

b. Slide the wear indicator tab to the left until it reaches the NEW position.

NOTE
The wear indicator tab should move with finger pressure (see Figure 7). Do not attempt to move the tab by striking or prying. If the tab is seized in place, not in the REPLACE position and will not move using finger pressure, the clutch must be replaced.

c. Remove foot from the clutch pedal, the tab will stay in its new position.

d. Adjust the clutch linkage until the fingers of the release yoke contact the release bearing wear pads. There should be zero free play at the clutch pedal when this step has been completed (refer to Figure 15).

e. Fully depress the clutch pedal a minimum of five times. As a result, you should gain free
play at the clutch pedal and the wear indicating tab on the clutch should slightly move away from the NEW position.

f. If the release bearing does not ‘squeeze’ the clutch brake when the pedal is down, adjust the linkage to move the yoke to zero clearance and depress the pedal five times. Recheck the free pedal.

g. With the pedal up, the release bearing should be 12.4 to 14.2 mm (1/2 to 9/16 inch) from the clutch brake when properly set up. With the pedal down, contacting the clutch brake ensures:

(1) The Solo clutch has adjusted fully to its new environment.

(2) The linkage is capable of pulling the bearing far enough to obtain ‘clutch brake squeeze’.

h. The Solo clutch will now automatically adjust itself during normal vehicle operation. The degree of clutch wear will be indicated by the indicator tab protruding through the clutch cover (refer to Figure 16).

DO NOT ADJUST THE BEARING TO CLUTCH BRAKE CLEARANCE OR THE CLUTCH BRAKE SQUEEZE POSITION TO ALTER FREE PEDAL. CORRECT BEARING TO CLUTCH BRAKE CLEARANCE SHOULD BE 12.4 TO 14.2 MM (1/2 TO 9/16 INCH). CLUTCH BRAKE SQUEEZE MUST CLAMP A 0.25 MM (0.010 INCH) FEELER GAUGE BETWEEN THE BEARING AND CLUTCH BRAKE WITH THE PEDAL DEPRESSED TO WITHIN 25 MM OR LESS FROM THE BOTTOM OF STROKE.

i. Check that there is approx 19 to 25 mm of free pedal in the cab. If not, adjust the upper pedal stop to acquire the desired free pedal as shown in Figure 17.
NOTE

Yoke to bearing clearance can be as little as 0.79 mm. Free pedal and yoke to bearing clearance will increase slightly as the clutch is used. It will then stabilise and maintain position.

TROUBLESHOOTING

22. *Set Up Verification Procedure*. If the clutch fails to operate properly, follow the set up verification procedure at Table 2 to ensure that the clutch has been installed and set up correctly.
Table 2 – Clutch Set-Up Verification Procedure

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
</table>
| Step A    | 1. Remove the clutch housing inspection plate.  
            2. Fully depress and release the clutch pedal once to ensure that the release bearing is as far rearward as possible.  
            3. Measure the distance between rear of the release bearing and the friction face of the clutch brake as shown at Figure 15. Measurement must be between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch). | If bearing travel is between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch)  
            If bearing travel is less than 12.4 mm Proceed to step D.  
            If bearing travel is greater than 14.2 mm Proceed to step I.  
            **NOTE**  
            Do not force the bearing forward while taking the measurement. | Proceed to step B.  
            Proceed to step D.  
            Proceed to step I. |
| Step B    | 1. Position a 0.010 inch feeler gauge between the front surface of the clutch brake and the rear of the release bearing and have someone depress the clutch pedal to the end of its travel. The feeler gauge should be held in place.  
            2. Slowly raise the pedal while pulling gently on the feeler gauge. | If the clutch brake squeeze occurs in the last 0.5 to 1 inch of clutch pedal travel  
            If brake squeeze does not hold the feeler gauge in place | Proceed to step C.  
            Inspect and adjust the linkage as necessary (refer to Para 21) then proceed to step A.  
            **NOTE**  
            The distance the pedal moves up from the fully depressed position to free the feeler gauge is called clutch brake squeeze.
<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
</table>
| C    | 1. Using a 6 mm diameter flat nose punch, lightly tap each of the four positive separator pins toward the flywheel. This can be done through the clutch housing inspection opening.  

**CAUTION**

**FAILURE TO PERFORM THIS STEP PROPERLY MAY CAUSE THE CLUTCH TO DRAG (CLUTCH DOES NOT RELEASE). EXCESSIVE FORCE CAN DAMAGE THE PINS AND CAUSE A RELEASE PROBLEM.**

2. Measure the distance between the release yoke fingers and the release bearing wear pad.  

If the measurement is between 1.57 mm and 3.17 mm  
**Proceed to step V.**  
If travel is outside the range  
**Inspect and adjust the linkage as necessary (refer to Para 21) then proceed to step A.** |
| D    | 1. Perform clutch resetting procedure in accordance with Para 18a to c.  

1. Install four 7/16 inch by 1-3/4 inch long UNC machine screws in the cover at the locations shown at Figure 8 and tighten them until they bottom out. You will need to bar the engine over to access all holes.  
2. Remove the four bolts.  
3. Depress the clutch pedal until it bottoms, compressing the clutch brake a minimum of five times, allowing the clutch to automatically reposition the bearing.  
4. Measure the distance between rear of the release bearing and the friction face of the clutch brake as shown at Figure 15. Measurement must be between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch).  

**NOTE**

Do not force the bearing forward while taking the measurement.  

If bearing travel is between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch)  
**Proceed to step B.**  
If bearing travel is outside the range of 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch)  
**Replace the clutch then complete step J.**  
**Proceed to step G.** |
| E    | 1. With the clutch linkage still attached, loosen all the transmission mounting bolts and insert temporary spacers of uniform thickness (washers or similar items 6.5 mm to 12 mm thick) between the flywheel housing and the clutch housing.  

**NOTE**

To avoid difficulty in reinstalling the transmission, do not pull the transmission back more than 12 mm from the flywheel housing.  
2. Have an assistant depress the clutch pedal to draw the release bearing back further and hold it there.  
3. Move the wear tab to the NEW position and then release the pedal.  
4. Remove the spacers, reinstall the transmission and tighten all fasteners to required torque settings.  

**Proceed to Step E.** |
| F    | 1. Install four 7/16 inch by 1-3/4 inch long UNC machine screws in the cover at the locations shown at Figure 8 and tighten them until they bottom out. You will need to bar the engine over to access all holes.  
2. Remove the four bolts.  
3. Depress the clutch pedal until it bottoms, compressing the clutch brake a minimum of five times, allowing the clutch to automatically reposition the bearing.  
4. Measure the distance between rear of the release bearing and the friction face of the clutch brake as shown at Figure 15. Measurement must be between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch).  

**NOTE**

Do not force the bearing forward while taking the measurement.  

If bearing travel is between 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch)  
**Proceed to step B.**  
If bearing travel is outside the range of 12.4 mm to 14.2 mm (1/2 inch to 9/16 inch)  
**Replace the clutch then complete step J.**  
**Proceed to step G.** |
<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>1. Determine the wear tab position.</td>
<td>If the wear tab is between NEW and REPLACE and bearing travel is greater than 14.2 mm&lt;br&gt; If the wear tab is in the REPLACE position</td>
<td>Proceed to step J.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Replace the clutch then complete step J.</td>
</tr>
<tr>
<td>H</td>
<td>1. Spray WD-40 into the wear tab cam slot and all three spring perches. Ensure there is full penetration of WD-40 into the cam (refer to Figure 18).&lt;br&gt; DO NOT SUBSTITUTE ANOTHER PRODUCT FOR WD-40 AS IT MAY DAMAGE THE CAM MATERIAL.</td>
<td>If the wear tab is in the REPLACE position&lt;br&gt; Replace the clutch then complete step J.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Mark the indicator tab position. The mark will be used later as an indicator for cam adjustment.</td>
<td>&lt;br&gt; 3. Depress and hold the clutch pedal down.</td>
<td>Proceed to step I.</td>
</tr>
<tr>
<td></td>
<td>4. Insert the end of the Solo clutch tool (refer to Para 5a) under the bearing and the threaded bolt extending into the indicator tab slot then push the tool to move the cam towards the engine. Spray WD-40 into the cam slot and jiggle the tool to free the cam. Do not use force.</td>
<td>If cam moves freely&lt;br&gt; If cam is still locked after two attempts</td>
<td>Replace the clutch then complete step J.</td>
</tr>
<tr>
<td>I</td>
<td>1. Use the tool Solo clutch tool (refer to Para 5a) to move the cam towards the REPLACE position using sideways pressure.</td>
<td>When the cam moves to the right of the original marked position the release bearing should have moved closer to the clutch brake, increasing the free pedal in the cab&lt;br&gt; If bearing travel is between 12.4 mm and 14.2 mm&lt;br&gt; If bearing position is less than 12.4 mm this may have occurred due to excessive force placed on the cam during adjustment</td>
<td>Proceed to step B. Proceed to step E.</td>
</tr>
<tr>
<td></td>
<td>2. Measure the distance between the release bearing and the front friction face of the clutch brake. Ensure you don't force the bearing forward while taking this measurement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>1. Ensure vehicle is in neutral and start engine.</td>
<td>If 1st gear engagement is obtained properly&lt;br&gt; If grinding occurs during engagement after waiting three seconds with the clutch pedal fully depressed and clutch was just installed&lt;br&gt; If grinding occurs during engagement after waiting three seconds with the clutch pedal fully depressed</td>
<td>Clutch is functioning correctly. Procedure complete. Return to step A to find error in set up. Replace the clutch then complete step J.</td>
</tr>
<tr>
<td></td>
<td>2. Depress the clutch pedal fully to engage the clutch brake.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Wait three seconds then attempt to select 1st gear.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GROUP 6 – TRANSMISSION

WARNING

BEFORE STARTING ANY DRIVELINE MAINTENANCE PROCEDURES ON THIS VEHICLE, PLACE THE TRANSMISSION IN NEUTRAL, APPLY THE PARKING BRAKES AND CHOCK THE WHEELS.

CAUTION

TO AVOID TRANSMISSION DAMAGE WHEN TOWING THIS VEHICLE, PLACE THE TRANSMISSION IN NEUTRAL AND REMOVE ALL FOUR REAR AXLES. THIS VEHICLE MUST BE TRANSPORTED BY TRAILER IF THE NATURE OF DAMAGE PREVENTS FRONT LIFT TOWING.

23. Table 3 provides the torque settings for fasteners used in the transmission as shown in Figure 19.

Table 3 – Transmission Torque Settings

<table>
<thead>
<tr>
<th>Fastener Description</th>
<th>Torque N.m (lbf.ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch housing to flywheel housing</td>
<td>102 (75)</td>
</tr>
<tr>
<td>Front bearing cover capscrews</td>
<td>339-407 (250-300)</td>
</tr>
<tr>
<td>Clutch housing nuts</td>
<td>244-257 (180-190)</td>
</tr>
<tr>
<td>Clutch housing capscrews</td>
<td>122-136 (90-100)</td>
</tr>
<tr>
<td>Slave valve capscrews</td>
<td>11-16 (8-12)</td>
</tr>
<tr>
<td>Front countershaft bearing retainer</td>
<td>122-163 (90-120)</td>
</tr>
<tr>
<td>Capscrews</td>
<td></td>
</tr>
<tr>
<td>Shift block and yoke lockscREWs</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Shift lever and shift bar housing</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Capscrews</td>
<td></td>
</tr>
<tr>
<td>Oil drain plug</td>
<td>61-74 (45-55)</td>
</tr>
<tr>
<td>Mainshaft bearing retainer capscrews</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Oil filler plug</td>
<td>48-68 (35-50)</td>
</tr>
<tr>
<td>Air filter/regulator mounting capscrews</td>
<td>11-16 (8-12)</td>
</tr>
<tr>
<td>Range cylinder shift bar nut</td>
<td>95-115 (70-85)</td>
</tr>
<tr>
<td>Auxiliary housing capscrews</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Output shaft nut</td>
<td>610-678 (450-500)</td>
</tr>
<tr>
<td>Mainshaft rear bearing cover capscrews</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Range cylinder mounting capscrews</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Range cylinder cover capscrews</td>
<td>48-61 (35-45)</td>
</tr>
<tr>
<td>Rear countershaft bearing cover capscrews</td>
<td>48-61 (35-45)</td>
</tr>
</tbody>
</table>

SLAVE VALVE

24. **Removal.** To remove the slave valve, proceed as follows:
   
   a. Drain the air from the brake system.
   
   b. Mark then disconnect the air lines from the slave valve fittings.
   
   c. Remove the cap screws securing the slave valve to the transmission case and remove the valve assembly.
   
   d. Remove the plunger and spring (Figure 20) from the transmission case bore.

![Figure 20 – Slave Valve Plunger and Spring](image)

25. **Installation.** To install the slave valve, proceed as follows:
   
   a. Refit the air line fittings into the slave valve body using a suitable thread sealant.
b. Install the spring and plunger into the bore in the transmission case.

c. Fit a new gasket and refit the slave valve. Apply a medium strength thread locking agent to the threads of the cap screws and tighten to 11 to 16 N.m (8 to 12 lbf.ft).

d. Reconnect the air lines as marked (refer to Figure 21).

c. Pressure output from the regulator should be 396 to 431 kPa (57.5 to 62.5 psi) if the pressure is outside the allowable range the regulator must be replaced.

26. Filter Replacement. To replace the filter element, proceed as follows:

a. Drain the air from the truck’s air system.

b. Remove the end cap from the filter regulator and withdraw the filter element.

c. Clean the end cap and body using a clean lint free cloth or low pressure air.

d. Insert a clean filter element into the body, replace the ‘O’ rings and refit the end cap.

27. Regulator Pressure Test. If range selection is not functioning correctly a pressure test will need to be conducted to test the regulator output. To do this, proceed as follows:

a. Remove the output line from the regulator and connect a suitable pressure gauge.

b. Start the engine and build up system air pressure.

c. Pressure output from the regulator should be 396 to 431 kPa (57.5 to 62.5 psi) if the pressure is outside the allowable range the regulator must be replaced.

28. Removal. To remove the filter regulator, proceed as follows:

a. Drain the air from the truck’s brake system.

b. Mark and disconnect the air lines from the filter regulator.

c. Remove the two cap screws and remove the filter regulator from the transmission.

29. Disassembly. Disassemble the filter regulator in accordance with Figure 22.

Figure 21 – Transmission Air Lines

AIR FILTER REGULATOR

26. Filter Replacement. To replace the filter element, proceed as follows:

a. Drain the air from the truck’s air system.

b. Remove the end cap from the filter regulator and withdraw the filter element.

c. Clean the end cap and body using a clean lint free cloth or low pressure air.

d. Insert a clean filter element into the body, replace the ‘O’ rings and refit the end cap.

27. Regulator Pressure Test. If range selection is not functioning correctly a pressure test will need to be conducted to test the regulator output. To do this, proceed as follows:

a. Remove the output line from the regulator and connect a suitable pressure gauge.

b. Start the engine and build up system air pressure.

c. Pressure output from the regulator should be 396 to 431 kPa (57.5 to 62.5 psi) if the pressure is outside the allowable range the regulator must be replaced.

28. Removal. To remove the filter regulator, proceed as follows:

a. Drain the air from the truck’s brake system.

b. Mark and disconnect the air lines from the filter regulator.

c. Remove the two cap screws and remove the filter regulator from the transmission.

29. Disassembly. Disassemble the filter regulator in accordance with Figure 22.
30. **Cleaning and Inspection.** To clean and inspect the filter regulator, proceed as follows:
   
   **a.** Clean all metal components with cleaning spirit and blow dry with low pressure air. Ensure all bores and galleries are free of foreign matter.
   
   **b.** Visually inspect all components for damage and wear and inspect the condition of the filter element. Replace parts as necessary.

31. **Assembly.** Assemble the filter regulator in reverse order to disassembly.

32. **Installation.** To install the filter regulator, proceed as follows:

   **a.** Fit the filter regulator to its position on the auxiliary case. Apply a medium strength thread locking agent to the threads of the cap screws and tighten to 11 to 16 N.m (8 to 12 lbf.ft).
   
   **b.** Reconnect the air lines as marked.

**TRANSMISSION REMOVAL**

33. **Removal.** Remove the transmission in accordance with EMEI Vehicle G 704 using transmission jack 5019 (refer to Para 5b). The following additional tasks are to be conducted prior to splitting the transmission from the engine:

   **a.** Remove the PTO air lines and sender wiring.
   
   **b.** Disconnect the air supply line from the filter/regulator at the rear of the transmission.
   
   **c.** Tag and disconnect the air lines from the slave valve leading to the Roadranger valve and remove the gear shift lever housing in accordance with EMEI Vehicle D 323.
   
   **d.** Remove both hydraulic pumps from the PTOs and support in such a manner that the hoses are not kinked or damaged and that the pumps are out of the way of the transmission.
   
   **e.** Disconnect and plug the transmission oil cooler hoses and ports.

**CLUTCH HOUSING**

34. **Removal.** Loosen and remove the four cap screws and six nuts securing the clutch housing to the transmission case and remove the housing.

35. **Installation.** Position a new gasket onto the transmission case, ensuring that the side with the blue gasket sealant is against the transmission case then refit the clutch housing. Fit the nuts and cap screws. Tension the six nuts to 244 to 258 N.m (180 to 190 lbf.ft) and the four cap screws to 122 to 136 N.m (90 to 100 lbf.ft).

**TRANSMISSION INSTALLATION**

36. **Installation.** Install the transmission in accordance with EMEI Vehicle G 704 with the following additional tasks to be conducted after bolting the transmission to the engine:

   **a.** Refit the transmission oil cooler hoses.
   
   **b.** Lightly grease the splined shafts of the hydraulic pumps then refit the pumps to the PTOs.
   
   **c.** Reconnect the PTO air lines and switch wiring.
   
   **d.** Refit the gear shift lever housing in accordance with EMEI Vehicle D 323.
   
   **e.** Reconnect the air lines from the Roadranger valve to the slave valve.
   
   **f.** Reconnect the air supply line to the governor at the rear of the transmission.
   
   **g.** Fill the transmission to the correct level with fresh oil and road test the vehicle.

**GROUP 7 – TRANSFER CASE**

37. For maintenance procedures related to the transfer case and transfer case oil cooler, refer to the following:

   **a.** EMEI Vehicle G 703,
   
   **b.** EMEI Vehicle G 704,
   
   **c.** EMEI Vehicle G 704-1, and
   
   **d.** Normax Transfer Case Oil Cooler Handbook.

**GROUP 9 – REAR AXLES**

38. For maintenance procedures related to the rear axle group, refer to the following:

   **a.** EMEI Vehicle G 703,
   
   **b.** EMEI Vehicle G 704,
   
   **c.** EMEI Vehicle G 704-1, and
   
   **d.** EMEI Vehicle G 704-2.

**GROUP 10 – FRONT AXLE**

39. For maintenance procedures related to the front axle group, refer to the following:

   **a.** EMEI Vehicle G 704, and
   
   **b.** EMEI Vehicle G 704-1.

**GROUP 12 – BRAKE SYSTEM**

40. For maintenance procedures related to the main brake system, refer to the following:

   **a.** EMEI Vehicle G 703,
41. **Front Suspension.** For maintenance procedures related to the front suspension, refer to the following:
   a. EMEI Vehicle G 703, and
   b. EMEI Vehicle G 704.

42. **Rear Suspension.** For maintenance procedures related to the rear suspension, refer to the following:
   a. EMEI Vehicle G 798-10,
   b. EMEI Vehicle G 703-1, and
   c. EMEI Vehicle G 704-2.

43. For maintenance procedures related to the steering, refer to the following:
   a. EMEI Vehicle G 703,
   b. EMEI Vehicle G 704, and

44. For maintenance procedures related to the electrical system not contained in this EMEI, refer to the following:
   a. EMEI Vehicle G 703,
   b. EMEI Vehicle G 704, and
   c. EMEI Vehicle G 704-1.

45. **CABIN ISOLATION SYSTEM**

48. **Watts Link**

   a. Ensure the truck’s air system is charged and the cabin isolation sub-frame is at the correct ride height (100 mm between the cab isolation sub-frame and the chassis).

   b. Slide an appropriate length of timber (approximately 100 mm square) across the top of the main chassis rails at the point where the cabins join to support the rear of the cabin isolation frame. Drain the air system and dump the air from the cab air springs allowing the sub-frame to rest on the timber.

   c. Remove the mounting bolts securing the outer ends of the Watts link rods to the sub-frame then remove the ‘U’ bolts securing the anchor bar to the chassis.

   d. Pull the ends of the Watts link rods out of the mounting brackets and remove the assembly from the truck.

49. **Cleaning and Inspection.** To clean and inspect the Watts link, proceed as follows:

   a. Clean all components using a pressure cleaner.

   b. Inspect all components for damage, wear and cracks. Pay particular attention to the pivot and rod bushings. Repair or replace components as necessary.

50. **Installation.** To install the Watts link, proceed as follows:

   a. Place the Watts link assembly into position on the chassis, install and tighten the ‘U’ bolts.

   b. Locate the rods back into the mounting brackets, install and tighten the bolts.

   c. Charge the air system to inflate the air springs then remove the timber.

51. For maintenance procedures related to the cab heating and cooling systems, refer to the following:

   a. EMEI Vehicle G 703,
   b. EMEI Vehicle G 704,
   c. EMEI Vehicle G 704-1, and
   d. Crisp-Air Air Conditioning Handbook.
POWER TAKE-OFFS

SIX BOLT PTO (CRANE)

52. Removal. To remove the six bolt PTO, proceed as follows (refer to Figure 23):

a. Drain the oil from the transmission.

b. Remove the hydraulic pump without disconnecting hoses and support the pump so as not to place strain on the hoses.

c. Disconnect the air line and switch wire from the PTO actuating cylinder.

d. Support the PTO and remove the bolts securing it to the adaptor housing then withdraw the PTO from the transmission.

NOTE

The gaskets used between the PTO and adaptor are shims for setting backlash. If in good order they may be reused.

e. If necessary, remove the 45° adaptor.

53. Installation. To install the six bolt PTO, proceed as follows:

a. Install the adaptor if removed and tension the mounting nuts, 47 to 54 N.m (35 to 40 lbf.ft).

b. Install the PTO in the reverse order to removal. Tension the capscrews, 41 to 47 N.m (30 to 35 lbf.ft). Measure and set the backlash as described in Para 54.

c. Start the engine and run the PTO momentarily to check for noise which may indicate the following:

(1) A whining noise may indicate that the PTO has been mounted with too little backlash. Recheck the backlash and add shims as required.

(2) If the PTO clatters, it may be mounted with too much backlash. Recheck the backlash and remove shims as required.

d. Refill the transmission to the correct level.

e. Refit the hydraulic pump.

54. Measuring PTO Backlash. To measure the PTO backlash, proceed as follows:

NOTE

Set the PTO backlash on the six bolt PTO between the PTO and 45° adaptor.

a. Remove the shift housing and mount a dial indicator so that it will register the movement of the PTO input gear as shown in Figure 24.

b. Hold the PTO driver gear in the transmission to prevent movement, then rock the PTO input gear back and forth with your hand. Note the total movement on the dial indicator.

CAUTION

IF THE TOTAL BACKLASH BETWEEN THE SIX BOLT PTO AND TRANSMISSION EXCEEDS 0.30 MM THE ADAPTOR MUST BE REPLACED. THIS IS TO PREVENT PREMATURE PTO FAILURE.
c. Set the backlash at 0.15 mm to 0.30 mm by adding or subtracting gaskets.

**NOTE**

As a general rule, each 0.25 mm of gasket thickness will alter the backlash by approximately 0.15 mm.

d. Replace the shift housing and tension the four bolts, 21 to 27 N.m (16 to 20 lbf.ft).

**EIGHT BOLT PTO (RECOVERY SYSTEM)**

55. **Removal.** To remove the eight bolt PTO, proceed as follows (refer to Figure 25):

   a. Drain the oil from the transmission.

   b. Remove the tandem hydraulic pump without disconnecting hoses and support the pump so as not to place strain on the hoses.

   c. Disconnect the air line and switch wire from the PTO actuating cylinder.

   d. Support the PTO and remove the bolts securing it to the transmission then withdraw the PTO from the transmission.

   **NOTE**

   The gaskets used between the PTO and transmission are shims for setting backlash. If in good order they may be reused.

56. **Installation.** To install the eight bolt PTO, proceed as follows:

   a. Install the PTO in the reverse order to removal. Tension the capscrews, 61 to 68 N.m (45 to 50 lbf.ft) and the locking nuts, 75 to 81 N.m (55 to 60 lbf.ft). Measure and set the backlash as described in Para 54.

   **CAUTION**

   **THE TRANSMISSION AND PTO HAVE NO LUBRICATION AT THIS TIME, THEREFORE RUNNING TIME SHOULD BE AS SHORT AS POSSIBLE.**

   b. Start the engine and run the PTO momentarily to check for noise which may indicate the following:

      (1) A whining noise may indicate that the PTO has been mounted with too little backlash. Recheck the backlash and add shims as required.

      (2) If the PTO clatters, it may be mounted with too much backlash. Recheck the backlash and remove shims as required.

   c. Refill the transmission to the correct level.

d. Refit the hydraulic pump.

![Figure 25 – Eight Bolt PTO (Recovery)](image)

**HYDRAULIC SUPPLY SYSTEM**

57. This section provides maintenance information and procedures related to hydraulic system components common to both the crane and the recovery module. For specific system information refer to the relevant sections of this EIME.

**FLARETITE SEALS**

58. The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.

59. **Replacement.** To replace Flaretite seals, proceed as follows:

   a. Ensure the conical nose and flared seat of the fittings are clean and free of burrs.

   b. Fit the Flaretite seal squarely onto the nose of the male fitting the screw fittings together and tighten in accordance with Table 4.

   **Table 4 – Flaretite Seal Torque Settings**

<table>
<thead>
<tr>
<th>Fitting Size</th>
<th>Torque</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7/16 inch JIC</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>9/16 inch JIC</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>3/4 inch JIC</td>
<td>75</td>
<td>55</td>
</tr>
<tr>
<td>7/8 inch JIC</td>
<td>108</td>
<td>80</td>
</tr>
<tr>
<td>11/16 inch JIC</td>
<td>149</td>
<td>110</td>
</tr>
<tr>
<td>1-5/16 inch JIC</td>
<td>190</td>
<td>140</td>
</tr>
<tr>
<td>1-5/8 inch JIC</td>
<td>258</td>
<td>190</td>
</tr>
</tbody>
</table>
RELIEVING HYDRAULIC PRESSURE

60. Prior to working on the hydraulic system shut the engine down and relieve built up system pressure as follows:

   a. Remove the reservoir filler cap to ensure the reservoir has been vented then refit the cap.
   b. Cycle all hydraulic control valves fully in both directions to ensure that no pressure has been trapped in the lines or actuators.
   c. Carefully crack any fittings being removed to relieve residual pressure.
   d. Loosen load holding valve cylinder connections to relieve cylinder pressure before removing the cylinder.

HYDRAULIC RESERVOIR

61. Removal. To remove the hydraulic reservoir, proceed as follows (refer to Figure 26):

   a. Remove/open the catwalk to gain access to the reservoir.
   b. Remove the oil cooler assembly in accordance with EMEI Vehicle D 323.
   c. Drain the oil from the reservoir.
   d. Tag and disconnect the pickup and return lines from the reservoir.
   e. Remove the clamps securing the pipes to the sides of the reservoir.
   f. Remove the four mounting bolts, then using an overhead crane and appropriate slings, lift the reservoir out.

62. Disassembly. To disassemble the hydraulic reservoir, proceed as follows:

   a. Remove the filler neck and filter assemblies in accordance with EMEI Vehicle D 323.
   b. Remove all hydraulic fittings and sight glass.

63. Cleaning and Inspection. To clean and inspect the hydraulic reservoir, proceed as follows:

   a. Clean out the inside of the reservoir using clean solvent and dry thoroughly with lint free cloth and dry compressed air.
   b. Inspect the condition of mounting rubbers and replace if necessary.

64. Assembly. Assemble the hydraulic reservoir in reverse order to disassembly using new gaskets and hydraulic sealing compound.

65. Installation. Install the hydraulic reservoir in the reverse order to disassembly.

HYDRAULIC PUMPS

66. Removal. To remove the hydraulic pumps (Figure 27), proceed as follows:

   a. Close the relevant supply valve/s between the reservoir and the pump being removed.
   b. Position a container to catch the oil which will drain from the pump and hoses during removal.
   c. Tag and remove all hoses from the pump then cap the hose ends and pump ports.
   d. Remove the two bolts securing the support bracket to the rear of the transmission (tandem pump only).
   e. Support the pump, remove the bolts securing the pump to the PTO then slide the pump out of the PTO.

67. Installation. To install the hydraulic pumps, proceed as follows:

   a. Refit the pump to the PTO and tighten all mounting bolts and nuts.
b. Refit and tighten the two bolts securing the support bracket to the rear of the transmission (tandem pump only).

c. Reconnect the hoses to the pump and open the supply valve.

d. Check and if necessary top up the hydraulic reservoir.

e. Start the engine, engage the respective PTO and allow the pump to run at no load and at idle speed for two minutes. During this period the pump should run free and not develop an excessive amount of heat. If the unit operates properly, bleed and test the system (refer to Para 68).

BLEEDING HYDRAULIC CIRCUITS

68. After repairs to any hydraulic component, the crane’s hydraulic system must be bled to evacuate all air. If air is left to accumulate in the system, damage to hydraulic components can occur.

69. Damage that can occur may include:
   a. Cavitation damage to the pump.
   b. Slow, jerky crane actions.
   c. Auto-ignition (dieseling) resulting in burnt and damaged seals.

70. **Crane.** To bleed the crane hydraulic circuits, proceed as follows:
   a. Start the engine and engage the crane PTO.

   **NOTE**
   Monitor the hydraulic oil level and inspect the system for leaks during the bleeding procedure.

   b. Before unfolding the crane, operate the hydraulic cylinders against their stops.

   c. Fully raise the main boom.

   **CAUTION**
   TO AVOID SEAL DAMAGE, USE ONLY THE MINIMUM PRESSURE REQUIRED TO MOVE THE CRANE DURING INITIAL BLEEDING OF THE SLEW CYLINDERS.

   d. Slew the crane slowly to the left until it reaches the stop and then to the right, again until it reaches the stop.

   e. Slew the crane again, slowly to the left until reaching the stop, then slowly apply full pressure for 10 to 15 seconds. At the same time, visually inspect the slew cylinders, hoses and fittings for leaks. Repeat this process, slewing to the right.
f. If no leaks are evident, slew the crane in both directions at normal operating speed.

g. Retract and extend the main lift cylinder twice, holding full pressure for 10 to 15 seconds at each extent of travel the second time. Repeat this procedure for the outer boom cylinder followed by the extension cylinder.

h. When the crane and stabilisers have been returned to the transport position, re-check the oil level and, if necessary, top up.

71. Recovery System. To bleed the recovery hydraulic circuits after repairs, proceed as follows:

a. Start the engine and engage the recovery PTO leaving the engine at idle speed.

NOTE
Monitor the hydraulic oil level and inspect the system for leaks during the bleeding procedure.

b. Run the system with all valves in the neutral position for approximately 5 minutes.

c. Extend and retract all cylinders to their full travel several times and operate the winches in both directions. Check the hydraulic oil level.

NOTE
It is only possible to bleed the two secondary winch motors with the winch in low speed high pressure mode. This can only be achieved when the load exceeds 3 tonnes.

d. Increase the engine speed to 1500 rpm and repeat steps b and c.

e. Replace the return line oil filter at the completion of bleeding.

RECOVERY PLATFORM

WARNING
To avoid pinch and crush injuries, ensure that no part of the body is positioned under the spade assemblies or lifting equipment at any time. Gloves must be worn and extreme care used when handling wire rope and chains.

MECHANICAL SYSTEMS

Spade Legs

72. Removal. To remove the spade legs, proceed as follows:

WARNING
Ensure no part of the body is positioned under the spade assembly at any time.

NOTE
The spade legs are 1900 mm long, therefore it will be necessary to raise the vehicle on a hoist or ramp to allow the required clearance for the spades to be removed from the housing.

a. With the vehicle on the ground, remove the spade cylinder in accordance with EMEI Vehicle D 323. Ensure that the lower pin hole is accessible after removal of the cylinder.

b. With the truck positioned with clearance for the leg, lower a sling with an appropriate end that will not damage the pin down inside the leg until the sling eye is aligned with the pin holes. Insert the pin and ensure it is through the sling eye.

c. Using an overhead crane, take the weight of the leg and remove the chain then carefully lower the leg out of the tailgate assembly.

d. Repeat the procedure for the opposite leg.

73. Installation. To install the spade legs, proceed as follows:

a. Slide the leg back into the tailgate assembly and chain it up with the lower cylinder pin hole exposed.

b. Refit the hydraulic cylinder in accordance with EMEI Vehicle D 323.

c. Bleed the hydraulic system in accordance with Para 71 and test the operation of the spade leg.

Side Cabinets (Left)

74. Removal. To remove the left hand side cabinet, proceed as follows (refer to Figure 28):

CAUTION
All wiring, hydraulic and pneumatic lines must be tagged and their fitting locations recorded to ensure correct reassembly.

a. Disconnect the vehicle batteries and remove all CES from the cabinets including the fire extinguisher.
Figure 28 – Recovery Platform
b. Disconnect the two plugs from the winch PLC and remove the clamps securing the wiring harness to the rear of the cabinet.

c. Remove the AMU if fitted and disconnect the earth strap from the rear panel of the control cabinet.

d. Remove the control cabinet door strut.

e. Note the location of the hydraulic control levers then remove them all from their respective bosses.

f. Unbolt the upper PLC control panel followed by the main control panel. Tag and disconnect the wiring connectors and hydraulic lines to facilitate removal of the main control panel.

**NOTE**
Failure to cap hydraulic lines may result in the contamination of the hydraulic system.
Failure to cap hydraulic lines may result in the loss of fluid from the hydraulic reservoir.

g. Remove the main control panel and cap the hydraulic lines.

h. Remove the control lever cover panel then remove the four bolts securing the control lever mounting frame into the cabinet.

i. Remove the mounting screws from the sheave tensioner switch and remote control plug mounting bracket and rest within the cabinet (this is to allow easier access to the rear of the cabinet).

j. Tag and disconnect the plugs from the top of the winch display boxes and the camera.

k. Disconnect the power wires from the two cabinet lights.

l. Unbolt and remove the left hand mudguard and mudflap.

m. Remove the two coach bolts from the lifting points in the top of the side cabinet and install and tighten the lifting eyes supplied in the CES.

n. Remove all accessible screws securing the rear cover panel to rear of the cabinet with the exception of the two screws securing the panel to the control lever frame, climb down from the vehicle and lower the extendable step handles into the side cabinet.

o. Remove the nine cabinet mounting bolts, five from inside the second cabinet and four from under the rear mudguard section.

p. Attach a two legged sling to the lifting eyes and carefully take the weight of the side cabinet using an appropriate crane.

**WARNING**
PLACE A 100 × 50 MM BOARD BETWEEN THE SIDE CABINET AND THE SPADE LEG TO PREVENT THE CABINET SLIDING BACK DURING REMOVAL OF THE REAR COVER PANEL.

q. Carefully slide the cabinet out away from the frame approximately 150 mm to allow access to the rear cover panel at the back of the control cabinet.

r. Remove the split plates securing the wiring harnesses leading to the PLC display boxes and camera. Feed the harnesses and plugs out through the rear panel.

s. Remove the remaining screws securing the rear cover panel to the cabinet and carefully pull the cover and control lever frame away from the cabinet.

**CAUTION**
WHEN UTILISING THE ON VEHICLE CRANE TO REMOVE OR INSTALL STOWAGE BINS, THE ON BIN VEHICLE LIGHTING ELECTRICAL SYSTEM MAY BE LIVE. ALL EXPOSED ELECTRICAL TERMINALS MUST BE TAPED TO PREVENT POSSIBLE ELECTRICAL DAMAGE.

**CAUTION**
The lifting sling must be adjusted to ensure that the stowage bin is raised evenly. The forward leg should measure 61 links from its clevis shortening hook. The rear leg should measure 64 links from its clevis shortening hook. Failure to lift the stowage bin evenly may result in damage to the bin.

**NOTE**
The left hand side cabinet weighs 380 kg when empty.
t. Check to ensure that the cabinet is now free to be removed with all necessary wiring and fittings tagged, disconnected and stowed to prevent snagging during removal.

u. Ensure the rear panel and control lever frame are supported prior to removal of the cabinet. This can be done by wiring the panel to the spade leg housing.

v. Slide the cabinet completely off the sub-frame and lower onto appropriate stands to safely support the unit.

75. Installation. To install the left hand side cabinet, proceed as follows (refer to Figure 44 for wiring connections):

**WARNING**

PLACE A 100 x 50 MM BOARD BETWEEN THE SIDE CABINET AND THE SPADE LEG TO PREVENT THE CABINET SLIDING BACK DURING REMOVAL OF THE REAR COVER PANEL.

**CAUTION**

THE LIFTING SLING MUST BE ADJUSTED TO ENSURE THAT THE STOWAGE BIN IS RAISED EVENLY. THE FORWARD LEG SHOULD MEASURE 61 LINKS FROM ITS CLEVIS SHORTENING HOOK. THE REAR LEG SHOULD MEASURE 64 LINKS FROM ITS CLEVIS SHORTENING HOOK. FAILURE TO LIFT THE STOWAGE BIN EVENLY MAY RESULT IN DAMAGE TO THE BIN.

**NOTE**

Ensure the bolt holes in the rubber cabinet mounts and the mounting bracket under the rear guard are clean before lifting the cabinet onto the sub-frame.

a. Lift the cabinet back onto the sub-frame. At the same time have an assistant guide the control lever assembly and control panel through the rear of the cabinet.

b. Allow the cabinet to rest on the frame while still supported by the crane and untie the rear panel.

c. Maneouvre the control lever assembly and rear panel back into position and secure.

**NOTE**

After reconnection of all plugs and connectors there will be two spare wires behind the control panel labelled ‘11 Constant Power’ and ‘17 Spot Light’.

1. Ensure all wiring removed from inside the cabinet has been fed back through the rear panel and reconnected.

2. Slide the cabinet back into position, start the mounting bolts in their holes, lower the crane and tighten the mounting bolts.

3. Disconnect the crane and replace the lifting eyes with the coach bolts.

4. Disconnect the vehicle batteries via the battery isolation switch.

5. Reconnect the power wires to the two cabinet lights and the plugs to the PLC display boxes and camera.

6. Refit the split plates and grommets securing the PLC display wiring harnesses and camera wiring.

7. Refit the sheave tensioner switch and remote control plug mounting bracket.

8. Refit and secure the control lever cover panel.

**NOTE**

The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.

i. Reconnect the hydraulic lines and electrical plugs to the rear of the main control panel, refit and secure the panel.

m. Refit and secure the PLC isolation switch panel.

n. Refit and tighten the control levers. Ensure the two longest levers with red knobs are fitted to the winch control bosses.

o. Refit the control cabinet door strut, AMU and the earth strap to the rear of the cabinet.

p. Reconnect and secure the PLC plugs and wiring to the rear of the cabinet.

q. Refit left hand mudguard and mudflap.

r. Reconnect the vehicle batteries, test all lighting.

s. Replenish the hydraulic reservoir and bleed the system in accordance with Para 71.
t. Conduct a functional test of the recovery system in accordance with the HRV User Handbook Section 3 Chapter 1.

Side Cabinet (Right)

76. Removal. To remove the right hand side cabinet, proceed as follows:

**CAUTION**

ALL WIRING, HYDRAULIC AND PNEUMATIC LINES MUST BE TAGGED AND THEIR FITTING LOCATIONS RECORDED TO ENSURE CORRECT REASSEMBLY.

a. Disconnect the vehicle batteries via the battery isolation switch and remove all CES from the cabinets including the fire extinguisher.

b. Disconnect the two plugs from the winch PLC and remove the clamps securing the wiring harness to the rear of the cabinet.

c. Remove the AMU if fitted.

d. Remove the antenna tuner if fitted, disconnect the camera plug and feed the radio and camera cables out through the rear of the cabinet.

e. Disconnect the earth strap from the rear of the cabinet followed by the multi pin plugs.

f. Unbolt and remove the right hand mudguard and mudflap.

g. Remove the two coach bolts from the lifting points in the top of the side cabinet and install and tighten the lifting eyes supplied in the CES.

**CAUTION**

THE LIFTING SLING MUST BE ADJUSTED TO ENSURE THAT THE STOWAGE BIN IS RAISED EVENLY. THE FORWARD LEG SHOULD MEASURE 45 LINKS FROM ITS CLEVIS SHORTENING HOOK. THE REAR LEG SHOULD MEASURE 64 LINKS FROM ITS CLEVIS SHORTENING HOOK. FAILURE TO LIFT THE STOWAGE BIN EVENLY MAY RESULT IN DAMAGE TO THE BIN.

**NOTE**

The right hand side cabinet weighs 370 kg when empty.

h. Attach a two legged sling to the lifting eyes and carefully take the weight of the side cabinet using an overhead crane.

i. Remove the nine cabinet mounting bolts, five from inside the second cabinet and four from under the rear mudguard section.

**WARNING**

PLACE A 100 × 50 MM BOARD BETWEEN THE SIDE CABINET AND THE SPADE LEG TO PREVENT THE CABINET SLIDING BACK DURING REMOVAL OF THE REAR COVER PANEL.

j. Carefully slide the cabinet out away from the frame approximately 150 mm to allow access to the rear cover panel at the back of the control cabinet.

k. Crack loose both hydraulic pressure gauge lines from the bulkhead fittings to relieve any residual pressure. Remove and cap both lines and fittings.

**NOTE**

The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.

l. Check to ensure that all wiring and fittings connect through the rear cover panel have been disconnected and that none will become snagged on the side cabinet during removal.

m. Slide the cabinet completely off the sub-frame and lower onto appropriate stands and blocks to safely support the unit.

77. Installation. To install the right hand side body unit, proceed as follows (refer to Figure 44 for wiring connections):

**WARNING**

PLACE A 100 × 50 MM BOARD BETWEEN THE SIDE CABINET AND THE SPADE LEG TO PREVENT THE CABINET SLIDING BACK DURING REMOVAL OF THE REAR COVER PANEL.
THE LIFTING SLING MUST BE ADJUSTED TO ENSURE THAT THE STOWAGE BIN IS RAISED EVENLY. THE FORWARD LEG SHOULD MEASURE 45 LINKS FROM ITS CLEVIS SHORTENING HOOK. THE REAR LEG SHOULD MEASURE 64 LINKS FROM ITS CLEVIS SHORTENING HOOK. FAILURE TO LIFT THE STOWAGE BIN EVENLY MAY RESULT IN DAMAGE TO THE BIN.

NOTE
Ensure the bolt holes in the rubber cabinet mounts and the mounting bracket under the rear guard are clean before lifting the cabinet onto the sub-frame.

a. Lift the cabinet back onto the sub-frame and allow it to rest on the frame while still supported by the crane.

b. Reconnect the pressure gauge hoses to the bulkhead fittings.

NOTE
The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.

c. Slide the cabinet back into position, start the mounting bolts in their holes, lower the cabinet, disconnect the crane and tighten the mounting bolts.

d. Disconnect the crane and replace the lifting eyes with the coach bolts.

e. Reconnect the earth strap to the rear of the cabinet followed by the multi pin plugs.

f. Feed the radio and camera cables back into the cabinet, connect the camera plug and refit the antenna tuner.

g. Refit the AMU.

h. Reconnect and secure the PLC plugs and wiring to the rear of the cabinet.

i. Refit right hand mudguard and mudflap.

j. Reconnect the vehicle batteries, test all lighting.

k. Replenish the hydraulic reservoir and bleed the system in accordance with Para 71.

l. Conduct a functional test of the recovery system in accordance with the HRV User Handbook Section 3 Chapter 1.

Recovery Frame Repair

78. **Welding.** The recovery frame is manufactured from Domex 100 000 lb yield strength steel. All repairs can be carried out using standard welding procedures and filler materials in accordance with current standards.

HYDRAULIC SYSTEM

**CAUTION**

TO PREVENT CONTAMINATION AND DAMAGE TO HYDRAULIC COMPONENTS, REPAIRS MUST BE CARRIED OUT IN A CLEAN DUST FREE ENVIRONMENT.

79. Figure 43 shows the recovery system hydraulic circuit.

Control Valve

80. **Removal.** To remove the control valve, proceed as follows (refer to Figure 29):

a. Relieve the hydraulic pressure in accordance with Para 60 and drain the air from the truck’s brake system.

b. Remove the catwalk and access panels to gain access to the control valve.

c. Tag and disconnect all hydraulic lines from the control valve assembly. Cap all lines and ports to prevent the ingress of dirt.

d. Tag and disconnect the control cables and wiring plugs from the spool assemblies.

NOTE
To remove the electrical plugs from the control modules, ease the locking cap away from the rear of the plug using a small screwdriver (refer to Figure 30).

e. Disconnect the pneumatic supply line leading to the spool control modules.

f. Support the control valve assembly, remove the mounting nuts and lift the valve away from the mounting plate.
81. **Installation.** To install the control valve, proceed as follows:

   a. Install the control valve in the reverse order to removal ensuring all control cables, wiring and hoses are fitted to the correct points.

   b. Check and top up the hydraulic reservoir.

   c. Start the truck, bleed and test the valve and systems for correct function. Inspect for leaks and make any required corrections.

---

### Spool Function

<table>
<thead>
<tr>
<th>Spool</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Left winch</td>
</tr>
<tr>
<td>2.</td>
<td>Left spade cylinder</td>
</tr>
<tr>
<td>3.</td>
<td>Right spade cylinder</td>
</tr>
<tr>
<td>4.</td>
<td>Right winch</td>
</tr>
<tr>
<td>5.</td>
<td>Left tow cylinder</td>
</tr>
<tr>
<td>6.</td>
<td>Main lift cylinder</td>
</tr>
<tr>
<td>7.</td>
<td>Right tow cylinder</td>
</tr>
</tbody>
</table>

**Figure 29 – Control Valve Assembly**

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**RECOVERY CONTROL SYSTEMS**

82. Figure 42 illustrates the pneumatic circuit for the recovery system.

**INSPECTION AND TESTING**

83. Inspection and testing of winch ropes, chains and sheaves is to be carried out in accordance with EMEI Vehicle D 108 and MISC EQUIP O 008.

84. **Wear Limits.** For wear limits relating to pins and bushings refer to EMEI Vehicle D 323.

**REMOTE CONTROL PENDANT**

85. **Disassembly.** To disassemble the pendant control unit, proceed as follows (refer to Figure 31):

   **NOTE**

   The recovery remote control electrical circuit is shown at Figure 45.

   a. Unplug the cable from the truck.

   b. Ensure that the emergency stop button is released and the TOW/RECOVER switch is placed in the RECOVER position.

   c. Remove the lower cover then slide the housing sections off the frame.
d. Tag and record the locations of all wires then disconnect wiring from the contact element/s to be replaced. If the cable is to be replaced, remove wires 1 to 16 from all pendant terminals, remove the cable clamp and cable tie from the sleeve then withdraw the cable through the cable sleeve.

e. Release the pressure on the tightening device by backing off the centre screw then remove the screws securing the tightening device into the shafts. The shafts can now be spread far enough apart to permit removal of the tightening device and defective contact element/s.

86. **Cleaning and Inspection.** To clean and inspect the pendant control unit, proceed as follows:

![Figure 31 – Pendant Exploded View](image)

---

**CAUTION**

**DO NOT IMMERSE THE PENDANT CONTROL UNIT IN ANY FLUID.**

a. Wipe the housing and components with a clean dry lint free cloth. External surfaces may be cleaned using warm soapy water.

b. Inspect housing sections for cracks and repair or replace as necessary.
c. Check the condition of gaskets and replace if unserviceable.

d. Inspect the contact elements for wear, paying attention to moving parts, replace element if wear is apparent.

e. Inspect the condition of all buttons, bellows and centre plates, replace as required.

f. Inspect the cable, cable sleeve and all other components for damage and repair or replace as required.

87. Assembly. To assemble the pendant control unit, proceed as follows:

a. Fit the new contact element/s and resecure the shafts with the tightening device.

b. If removed, refit the cable by feeding it through the cable sleeve and reconnecting all wires to their respective pendant terminals as tagged. Otherwise reconnect wiring to new contact element/s.

c. If the cable was removed, refit the clamp and resecure the sleeve with a new cable tie.

d. Refit the housing and secure it by fitting the lower cover.

WINCHES

WINCH FASTENER TORQUE SETTINGS

88. Table 5 provides a list of torque settings for the fasteners used on the winch assemblies. Refer to the RPS for information on screw and bolt grades.

<table>
<thead>
<tr>
<th>Thread</th>
<th>Torque N.m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastener Grade</td>
<td>8.8</td>
</tr>
<tr>
<td>M6</td>
<td>9.5</td>
</tr>
<tr>
<td>M8</td>
<td>24</td>
</tr>
<tr>
<td>M10</td>
<td>47</td>
</tr>
<tr>
<td>M12</td>
<td>84</td>
</tr>
<tr>
<td>M16</td>
<td>210</td>
</tr>
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</table>

IDENTIFICATION OF WINCH COMPONENTS

89. Figure 32 identifies and shows the location of the main winch components.

PROGRAMMABLE LOGIC CONTROLLER (PLC)

90. Figure 33 shows the circuit board and the locations of fuses, LED and test points within the PLC box.
91. **Fuse Replacement.** To replace the PLC fuses, proceed as follows:
   
   a. Turn off the power to the PLC at the PLC isolation switch.
   
   b. Remove the PLC cover, test and replace fuses as necessary.

92. **Removal.** To remove a PLC, proceed as follows:
   
   a. Tag and disconnect the wiring plugs from the PLC box.
   
   b. Remove the PLC box from mounting point.

93. **Installation.** To install the PLC, proceed as follows:
   
   a. Install the PLC in reverse order to removal.
   
   b. Check and if necessary reset default settings in accordance with Para 125.

WINCH DISPLAY MONITORS

94. **Removal.** To remove a winch display monitor, proceed as follows:
   
   a. Isolate the power from the PLC and display monitor to be removed by placing the corresponding PLC isolation switch in the OFF (up) position.

   NOTE

   If both display monitors are being removed, mark the boxes and tag all wiring to ensure correct reassembly.

   b. Disconnect the wiring plug from the top of display monitor box then remove the front cover. Do not allow the cover to hang by the internal wiring.
   
   c. Remove the black earth wire from earth post inside the box and feed it out through the rear of the box.
   
   d. Remove the two screws and nuts securing the box into the cabinet, remove the box and refit the front cover to prevent damage to the monitor.

95. **Installation.** To install a winch display monitor, proceed as follows:
   
   a. Install the monitor in reverse order to removal.
   
   b. Check and if necessary reset default settings in accordance with Para 125.
WINCH ASSEMBLY

96. Removal. To remove the winches, proceed as follows:

a. Remove the catwalk panel above the winch well then remove the winch rope in accordance with the Technical Manual User Handbook – Truck, Wrecker, Heavy, MC3, 8 Tonne (Mack), Army (Aust) 6778.

b. Relieve the hydraulic system pressure in accordance with Para 60.

c. Remove the side cabinet to gain access to the winch in accordance with either Para 74 (left cabinet) or Para 76 (right cabinet).

d. Remove the junction box together with its mounting plate from the bracket on the rear of the winch frame and tie it back to the tail gate so it will not snag on the winch during removal. Ensure the earth wire fitted to junction box mounting plate is tagged and the location noted for reassembly.

e. Tag and disconnect the electrical, pneumatic and flexible hydraulic supply lines from the winch. Cap all pneumatic and hydraulic lines and ports. Take care not to lose the seal from between the proportional relief valve and plug when disconnecting.

NOTE
The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.

f. Remove and discard the six bolts and nyloc nuts securing the winch to the sub frame.

THE WINCH WEIGHS 524 KG WITH THE ROPE REMOVED, ENSURE ALL LIFTING EQUIPMENT IS RATED ACCORDINGLY.

g. Take the weight of the winch on an overhead crane using appropriate slings fitted around the winch drum and slide the winch away from the centre of the vehicle giving clearance to access the distance sensor.

h. Remove the two capscrews securing the distance sensor mounting bracket to the winch and remove the assembly. Tie the distance sensor out of the way of the winch.

i. Ensure all connections between the winch and the vehicle have been removed then carefully lift it clear of the vehicle.

97. Cleaning and Inspection. To clean and inspect the winch, proceed as follows:

a. Clean the winch using a pressure cleaner and wipe around electrical components and ‘V’ seal join with a clean cloth.

b. Inspect the winch for wear and damage and repair or replace as necessary.

c. Clean and inspect the sub-frame and winch mounting points and carry out any repairs necessary prior to installing a new or repaired winch.

98. Installation. To install the winch, proceed as follows:

a. Position the winch onto the sub-frame leaving enough room to refit the distance sensor.

b. Refit the distance sensor to the inner end of the winch then slide the winch into position, fit new mounting bolts and tighten to 298 N.m (220 lbf.ft).

c. Refit the junction box and earth wire to the rear of the winch.

d. Reconnect the hydraulic supply, electrical and pneumatic lines to the winch. Ensure to refit the seal between the proportional relief valve and wiring plug.

NOTE
The JIC hydraulic fittings used on the recovery module have been fitted with Flaretite seals to extend the life of the fittings and ensure positive sealing. These seals are to be replaced during installation in accordance with Para 59.
e. Refit the side cabinet in accordance with either Para 75 (left cabinet) or Para 77 (right cabinet).

f. Carry out Winch Set-Up and constant pull check in accordance with EMEI Vehicle D 329.

PRIMARY DRIVE MOTOR (OMH 250)

99. **Removal.** To remove the primary drive motor, proceed as follows (refer to Figure 34):

   a. Clean and dry the exterior of the primary drive assembly components prior to removal to prevent the ingress of contaminants into any open components.

   b. Tag and remove the hydraulic pipes from the motor then cap the ports and pipe ends.

   c. Remove the four cap screws securing the motor to the mounting plate, withdraw the motor and cap the opening to the brake unit.

**NOTE**

To remove the primary drive motor from the left hand winch with the winch mounted in the vehicle it will be necessary to remove the left hand cabinet (refer to Para 74). To remove the primary drive motor from the right hand winch with the winch mounted in the vehicle it will be necessary to remove the left hand winch (refer to Para 96).

100. **Installation.** To install the primary drive motor, proceed as follows (refer to Figure 34):

   a. Align the splines of the drive shaft with the brake discs and slide the motor into position. Fit the four cap screws and tighten in accordance with Table 5.

   b. Re-connect the pipes to the hydraulic motor and tighten the fittings.

   c. Bleed and test the winch in accordance with Paras 71 and EMEI Vehicle D 323.

Hydraulic Brake

101. **Removal.** To remove the hydraulic brake, proceed as follows (refer to Figure 34):

   a. Remove the OMH 250 motor in accordance with Para 99.

   b. Remove the hydraulic pipe from the brake unit.

   c. Remove the brake assembly mounting bolts and withdraw the unit from the drive shaft.

   d. Loosen the grub screw securing the brake hub to the drive gear shaft and remove the brake hub.

102. **Installation.** To install the hydraulic brake,
proceed as follows (refer to Figure 34):

a. Carefully slide the brake assembly onto the hub ensuring that the splines of the brake discs are aligned with the hub.

b. Apply Loctite 243 to the brake mounting bolts, install and tension them in accordance with Table 5.

c. Re-connect the brake hydraulic pipe to the brake cylinder port.

d. Install the OMH 250 motor in accordance with Para 100.

Primary Drive Gear Assembly

103. Removal. To remove the primary drive gear assembly, proceed as follows (refer to Figure 34):

a. Remove the OMT 250 motor and hydraulic brake in accordance with Paras 99 and 101.

b. Remove the hydraulic brake fastening plate and bearing.

c. Remove the gear housing and shaft from the gearbox end plate.

d. If necessary, remove the gear shaft and bearing from the gear housing.

104. Cleaning and Inspection. To clean and inspect the primary drive gear assembly, proceed as follows:

a. Clean the brake hub, brake fastening plate, drive gear, bearings and gear housing in clean solvent and dry thoroughly. Ensure all sealing compound has been removed from mating surfaces and that they are free of nicks and burrs.

b. Inspect the condition of all drive components, paying particular attention to the gear teeth and bearings. Replace unserviceable components as necessary.

105. Installation. To install the primary drive gear assembly, proceed as follows (refer to Figure 34):

NOTE

Where it is indicated to apply sealant, use Sabesto silicone sealant or equivalent.

a. Refit the bearings and gear shaft into the gear housing. Apply sealant to the mating surfaces of the bearing cover before installation.

b. Apply sealant to the mating surfaces of the gear housing and gearbox end plate. Fit the gear housing assembly and tighten the cap screws in accordance with Table 5.

c. Apply sealant to the mating surfaces of the gear housing and brake fastening plate. Refit the brake fastening plate and tighten the cap screws in accordance with Table 5.

d. Install the key into the gear shaft then slide the brake hub into position. Apply a small drop of Loctite 243 to the grub screw then install and tighten it to secure the hub.

e. Install the hydraulic brake and OMH 250 motor in accordance with Paras 102 and 100.

Hydraulic Valve Block

106. Removal and Installation. Removal and installation of the hydraulic valve block is to be conducted in accordance with EMEI Vehicle D 323. Refer to Figure 35 for winch hydraulic circuit.

107. Disassembly. To disassemble the hydraulic valve block, proceed as follows (refer to Figure 36):

a. Tag and or mark all fittings to ensure they are identified for correct installation.

CAUTION

ALL VALVES FITTED INTO THE VALVE BLOCK ARE FACTORY PRE-SET AND SHOULD NOT REQUIRE ADJUSTMENT.

b. Remove all valves fittings and sensors.

108. Cleaning and Inspection. To clean and inspect the hydraulic valve block, proceed as follows:

a. Flush the hydraulic block out with clean solvent and dry with low pressure compressed air.

b. Clean all other components with clean solvent and dry thoroughly. Ensure no electrical parts are submersed or cleaned in solvent.

c. Inspect the block for any signs of damage and repair or replace as necessary.

109. Assembly. To assemble the hydraulic valve block, proceed as follows:

a. Fit new ‘O’ rings and lightly lubricate all internal valves, fittings and plugs with hydraulic oil prior to installation.

b. Install all valves and fittings and tighten in accordance with Figure 36.

CONSTANT PULLING DEVICE

110. Removal. To remove the constant pulling device, proceed as follows (refer to Figure 37 and Figure 38):

a. Remove the electronic sensor and mounting bracket.
### Table of Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>OMH 250 motor</td>
<td>7.</td>
<td>Check valve</td>
<td>12.</td>
<td>Test point (M16 thread)</td>
</tr>
<tr>
<td>5.</td>
<td>Pressure sensor PG1</td>
<td>10.</td>
<td>Counterbalance (overcentre) valve (winch in)</td>
<td>15.</td>
<td>Pilot controlled pressure reducing valve</td>
</tr>
</tbody>
</table>

Figure 35 – Winch Hydraulic Circuit