TRUCK, SURVEILLANCE, LIGHTWEIGHT, W/W, MC2 – LANDROVER 110 4X4

FITTING INSTRUCTIONS FOR THE ARB CKMA12 AIR COMPRESSOR

MODIFICATION 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.

INTRODUCTION

1. This instruction details the installation of the 12 V air compressor (ARB CKMA12).

2. Associated Publications. Reference may be necessary to the latest issue of the following documents:
   c. ESCM, Volume 6 – Manage Repairable Items;
   d. EMEI Vehicle G 13 Decade – Truck, Surveillance, Lightweight, Winch, MC2 – Land Rover 110 4X4;
   e. Repair Parts Scale 02188 - Truck, Utility, Lightweight, MC2, 4x4, 1 Tonne, 3.9 Litre Diesel Engine, Manual Transmission, 12V, Land Rover Model 110 (Base Scale); and
   f. Repair Parts Scale 02207 - Truck, Surveillance, Land Rover 110, Isuzu Diesel Engine, 4x4, MC2, with Winch (Supplement to Repair Parts Scale 02188).

3. Authority. CGSVSPO EC 003509 is the authority to carry out this modification.

4. Standard Job. MMM Standard Job Number 006997 has been raised for the implementation of this modification.

GENERAL

5. Modification Application. This modification is to be applied to stock on issue to units and stock held in depot or pool stock.

6. Items Affected. This modification will alter the vehicle by the addition of an air compressor, electrical wiring loom including fuses and switches.

7. Priority – Group 2. All applicable equipment is to be modified:
   a. when next in a workshop for Light, Medium or Heavy Grade Repair; or
   b. prior to issue from depot or pool stock.

   NOTE
   Where modification would delay priority issues of depot or pool stock, equipment may be issued unmodified providing the equipment record book is endorsed appropriately.

8. Action Required. Actions detailed in this instruction are to be performed by technical maintenance organisations authorised to carry out Light, Medium or Heavy Grade Repairs by the following:
   a. Vehicle Mechanic ECN 229,
   b. Technician Electrical ECN 418, or
   c. civilian equivalent.
NOTE

On receipt of this instruction, enter all relevant information other than date completed in the modifications section of the GM 120 – Record Book for Service Equipment.

9. Task Recording. The conduct of this modification is to be recorded in an SDSS work order using MMM Standard Job Number 006997.

10. Estimated Work Hours. For initial planning purposes only, it is estimated that this modification will take 3.0 work hours to perform.

11. Stores Required. The stores required are supplied as a kit codified as NSN 4310-66-157-3537. The contents of the kit are listed in Table 1. Any stores not supplied in the kit are to be demanded through normal supply channels.

Table 1 Kit Contents – NSN 4310-66-157-3537

<table>
<thead>
<tr>
<th>Item</th>
<th>NIIN</th>
<th>Mfr Part No</th>
<th>Designation or Description</th>
<th>Qty Per Equip</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>66-156-7527</td>
<td>171301</td>
<td>Pump up extension kit</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>66-156-7528</td>
<td>180209</td>
<td>Isolating switch (12 V)</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>66-156-7529</td>
<td>180212</td>
<td>Switch cover (compressor)</td>
<td>1</td>
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<tr>
<td>4</td>
<td>66-156-7530</td>
<td>CKMA12</td>
<td>High output on-board air compressor (C/W CKMA12 mounting bracket)</td>
<td>1</td>
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<tr>
<td>5</td>
<td>66-156-7532</td>
<td>CO35</td>
<td>Pressure switch (1/4 in NPT)</td>
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</tr>
<tr>
<td>6</td>
<td>66-156-7533</td>
<td>CO42</td>
<td>Relay (12 V 40 A)</td>
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<tr>
<td>7</td>
<td>#LV TEFapon TAPE</td>
<td></td>
<td>Teflon tape</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>IHCWM010-16</td>
<td>10-16 mm mild steel worm drive clamp solid band</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>IHCWM08-12</td>
<td>8-12 mm mild steel worm drive clamp solid band</td>
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<td></td>
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<td>10</td>
<td>Z02027-04</td>
<td></td>
<td>Nipple 1/4 in NPT male / male</td>
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</tr>
<tr>
<td>11</td>
<td>Z02035-04</td>
<td></td>
<td>Tee piece 1/4 in NPT female</td>
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<td>12</td>
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<td>Female 1/4 in NPT X 5/16 in tailpiece</td>
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<td>13</td>
<td>Z06103-0504</td>
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<td>1/4 in NPT male X 5/16 in barb</td>
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</tr>
<tr>
<td>14</td>
<td>Z06103-0604</td>
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<td>1/4 in NPT male X 3/8 in barb</td>
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<td>15</td>
<td>66-161-2748</td>
<td>DE2530800003</td>
<td>Upgraded Wiring Loom (Version 2) CKMA12 air compressor</td>
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<td>16</td>
<td>66-128-4515</td>
<td>MYH5295</td>
<td>Hose, Nonmetallic, Rubber, 8 mm Id, 18 mm od 500 lg</td>
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<tr>
<td>17</td>
<td>MAX 30</td>
<td></td>
<td>Fuse (30 A) Spaded – MAXI FUSE</td>
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<td>18</td>
<td>99-122-5295</td>
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<td>Nut, Plain, Hexagon, Steel, 6 mm, Zinc Plt</td>
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<td>19</td>
<td>99-122-5360</td>
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<td>Screw, Cap, Hexagon Head, ISO M, 8g Steel, Galv Finish, M6, 16 mm lg</td>
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</tr>
<tr>
<td>20</td>
<td>99-122-5361</td>
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<td>Screw, Cap, Hexagon Head, ISO Metric, Steel, Zinc Coated, 6 mm Dia, 20 mm lg</td>
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<tr>
<td>21</td>
<td>99-122-6474</td>
<td></td>
<td>Washer, Flat, Steel, Rd, Steel, Zinc Plated, 6 mm nom Bolt Size, 12.50 mm od, 1.60 mm thk</td>
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<tr>
<td>22</td>
<td>99-208-6458</td>
<td></td>
<td>Washer, Lock, Steel, Single Turn, Zinc Coated, 6 mm Bolt Size, 11.7 mm od, 1.7 mm thk</td>
<td>11</td>
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<tr>
<td>23</td>
<td>10006503-01</td>
<td></td>
<td>Socket, male, threaded, BSPT, 025 in</td>
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<tr>
<td>24</td>
<td>15011113</td>
<td></td>
<td>Bracket, air compressor, steel, 2 mm thk</td>
<td>1</td>
</tr>
</tbody>
</table>
12. **Drawings Required.** A CKMA12 air compressor wiring diagram is shown in Figure 1.

![Figure 1 CKMA12 Air Compressor Wiring Diagram](image1)

**CAUTION**

Prior to modification commencement ensure that the vehicle batteries are isolated (disconnected). Failure to do so may result in damage to vehicle electrical components.

13. Disconnect the batteries.

**Compressor Installation**

14. Install the ARB CKMA12 air compressor as follows:

   a. Remove the steering universal joint guard from the drive side wheel well (Figure 2).

![Figure 2 Location of Universal Joint Guard](image2)
b. Remove the CKMA12 mounting bracket from the ARB CKMA12 air compressor (Figure 3).

![Figure 3](image1.png)

**Figure 3** ARB CKMA12 Air Compressor and CKMA12 Mounting Bracket

c. Fit the CKMA12 mounting bracket to the air compressor bracket (Table 1, Item 24) using four M6 x 20 mm bolts, flat washers, spring washers and 6mm plain nuts (Figure 4).

![Figure 4](image2.png)

**Figure 4** Air Compressor Bracket and CKMA12 Mounting Bracket

d. Fit the universal joint guard and the air compressor bracket using the bottom holes, as shown in Figure 4, to the driver’s side wheel well using the existing holes that fastened the universal joint guard. Fasten with two M6 x 20 mm bolts, flat washers, spring washers and 6mm plain nuts.

e. When the universal joint guard and the air compressor bracket have been fitted, drill two 7 mm holes in the driver’s side wheel well using the top holes of the air compressor bracket, as shown in Figure 4, as a guide.

f. Fasten the air compressor bracket using two M6 x 20 mm bolts, flat washers, spring washers and 6 mm plain nuts to the wheel well (Figure 5).
Figure 5  Fastened Universal Joint Guard and the Air Compressor Bracket

NOTE
Use thread sealant or Teflon tape on brass fittings.

g. Install all the brass fittings to the compressor before fastening it to the mounting bracket as follows (Figure 6):
   (1) Attach the 3/8 inch brass barb fitting to the ARB CKMA12 air compressor inlet port.
   (2) Attach the brass 1/4 inch NPT nipple into the bottom of the brass T piece.

NOTE
Do not over-tighten the nipple into the compressor as it could crack the housing.
   (3) Attach the T piece with a nipple into the outlet port on the compressor. Ensure that the T piece is positioned horizontally to the length of the compressor.
   (4) Attach the 5/16 inch brass barb fitting into the T piece facing towards the piston end of the compressor.
   (5) Attach the pressure switch into the remaining end of the T piece.
15. Loosen the two cap screws used to clamp the compressor mount (Figure 7).

![Figure 7 Cap Screws - Compressor Mount Clamp](image)

16. Mount the compressor onto the mounting bracket, by attaching the bottom bolts first with the compressor leaning towards the centre of the vehicle (Figure 8).

![Figure 8 Compressor Mounting](image)

17. Position the compressor as shown in Figure 9 and then retighten the clamp bolts.

![Figure 9 Compressor Positioning](image)
NOTE
If experiencing difficulty, heat the hose in hot water before attaching onto the 3/8 inch brass barb. Ensure that a 10-16 mm hose clamp is put onto the hose before attaching to the brass barb.

18. Attach the inlet hose to the 3/8 inch brass barb fitting on the air compressor (Figure 6).

19. Route the high temperature hose around the engine bay as shown in Figure 10.

![High Temperature Hose Routing Configuration](image)

NOTE
If experiencing difficulty, heat the hose in hot water before attaching onto the 5/16 inch brass barb. Ensure that a 8 to 12 mm hose clamp is positioned on the hose before attaching the hose onto the brass barb.

20. Attach the high temperature hose to the compressor outlet port 5/16 inch brass barb (Figure 6).

NOTE
Ensure that a 8 to 12 mm hose clamp is positioned on the hose before attaching the hose onto the brass barb.

21. Attach the 5/16 inch brass barb with a 1/4 inch BSPT female fitting to the remaining end of the high-temperature hose (Figure 11).

![5/16 Inch Brass Barb with a 1/4 Inch BSPT Female Fitting](image)
22. Drill a Ø14 mm hole in left hand side firewall in the location shown in Figure 12.

**NOTE**

Ensure that the high-temperature hose is not twisted or damaged during this process.

23. Screw the existing quick-disconnect fitting on the firewall passenger side (Figure 12), to the 1/4 inch BSPT female end of the high-temperature hose (Figure 11).

![Quick Disconnect Fitting](image)

**Figure 12** Quick Disconnect Fitting

**Wiring Loom Installation**

24. Gain access to the dash instrument panel as follows:

a. Disconnect the speedometer cable at the transponder (Figure 13).

![Speedometer Cable](image)

**Figure 13** Speedometer Cable
b. Partially remove the dash instrument panel by removing the four dash screws, two either side of the dash (Figure 14).

![Figure 14 Partially Removed Dash](image14)

**Figure 14** Partially Removed Dash

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c. Partially remove the right-hand side switch panel as shown in Figure 15.

![Figure 15 Right-Hand Side Switch Panel](image15)

**Figure 15** Right-Hand Side Switch Panel

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25. Install the new wiring loom as follows:

a. Route the compressor wiring loom in the engine bay as shown in Figure 16.
b. Attach the red power terminal to the starter motor (Figure 17).

![Starter Motor Connection](image)

**Figure 17   Starter Motor Terminal**

c. **Fuse Holder.** Install the fuse holder as follows:

1. Using the 30 Amp Maxi fuse holder mounting plate, mark two holes on the passenger side wheel well in the locations (Figure 18).
2. Drill the two holes using a 6 mm drill bit.
3. Attach the fuse holder with M6 x 15 mm bolts with a flat washer either side of the wheel well and spring washer on the nut side (the nut will be on the outside of the vehicle).
4. Secure the 30 Amp Maxi fuse holder to the passenger side wheel well.

![Fuse Holder Position](image)

**Figure 18   Fuse Holder Position**
d. **Earth Connector.** Trace the loom back to the earth connector and terminate the earth wire at the position on the fire wall (Figure 19).

![Drivers Side Grommet](Image)

**Figure 19** Earth Termination

e. **Relay.** Install the relay as follows:

1. Drill a hole using a 6 mm drill in the driver’s side wheel well (Figure 20).

2. Attach and secure the relay with an M6 x 15 mm bolt with a flat washer either side of the wheel well and a spring washer on the nut side (the nut will be on the outside of the vehicle).
(3) Attach the T plug (male) to the compressor power plug.

NOTE

The X7 and X6 terminal signal wires can go on either spade connection on the pressure switch.

(4) Attach the X7 and X6 terminal signal wires to the pressure switch (Figure 20).

NOTE

f. Compressor Dash Switch. Route the On/Off (X1 and X2 terminals) signal wires through the firewall driver’s side grommet (Figure 21).

![Figure 21 On/Off Signal Wires](image)

NOTE

Ensure that the On/Off signal wires are routed underneath the cross bar (Figure 22).

![Figure 22 Dash Wiring](image)

g. Remove the blanking plug from the right-hand side switch panel, which was partially removed in Para 22.c.

NOTE

It maybe necessary to remove approximately 2 mm of material from the top and bottom of the rectangular hole where the blanking plug was located in the right hand switch panel before the compressor switch can be fitted.
h. Fit the compressor switch into the hole, in the right-hand side switch panel, from where the blanking plug was removed (Figure 22).

i. Connect the On/Off signal wires to the compressor switch, as shown in Figure 23.

![Figure 23 Compressor On/Off Switch](image)

j. Refit the right-hand side switch panel.

k. Refit the dash instrument panel.

l. Reconnect the speedometer cable to the transponder.

m. Secure the wiring loom, hoses and electrical connections into position using cable ties or suitable fasteners.

26. Reconnect the vehicle batteries.

System Test

27. Test the compressor system by turning on the compressor switch. The compressor should turn off within 10 seconds when it reaches the pressure switch limits.

28. Ensure that there are no leaks in the system.

29. Turn off the compressor switch.

Recording Action

30. On completion of the modification, the following action is to be taken in accordance with The TRAMM-L, Volume 3, Section 2, Chapter 2, Annex D:

a. Deface the numbers 35 and 34 on the equipment modification record plate.

b. Complete the modification details in the GM 120 – Record Book for Service Equipment.

c. Record the modification in an SDSS Work Order using MMM Standard Job Number 006997.

d. Enter the modification details (for modification strike record No) in MILIS MSE600 via the Reference Codes Tab.

END

(Sponsor: CGSVSPO, Lt B Veh)

(Authority: CGSVSPO EC-003509)