

**TRUCK, FLATBED, HEAVY, MC3, GUN TRACTOR/AMMO TRANSPORTER  
W/CRANE, W/WINCH, MACK**

**INSTALLATION OF AN UPGRADED 24 V DC ELECTRICAL POWER SYSTEM**

**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.

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## INTRODUCTION

1. This instruction details the modifications required to upgrade the 24 V dc electrical power system for the Truck, Flatbed, Heavy, MC3, Gun Tractor/Ammo Transporter w/Crane, w/Winch, Mack.
2. The primary elements of the upgrade involve replacing the existing 28 V dc generator (set at 40 amp) with a fully refurbished and tested version of the same type (set at 100 amp) and the installation of larger capacity, high performance batteries into the existing battery box. Supporting elements involve replacement of the generator harness, modifications to the existing generator sense line arrangement and fitting the following:
  - a. bus bars inside the battery box;
  - b. battery voltage sense relay; and
  - c. electrical spike/surge protector.
3. **Associated Publications.** Reference may be necessary to the latest issue of the following documents:
  - a. Technical Regulation of ADF Materiel Manual - Land (TRAMM-L);
  - b. Electronic Supply Chain Manual (ESCM), Volume 4, Section 3 – Supply Management Processes, Stores Accounting General, ESCM website <http://escmv4web/8210.htm>;
  - c. [EMEI Electrical P 413](#) GENERATOR, ENGINE ACCESSORY, 28 V, 100 A - Light Grade Repair;
  - d. [EMEI Vehicle G 703](#) TRUCK, CARGO, HEAVY, MACK - Light Grade Repair;
  - e. Defence Safety Manual (SAFETYMAN).
4. **Authority.** Commercial and General Service Vehicles System Program Office (CGSVSPO Medium/Heavy B Vehicles) Engineering Change Order (ECO) 100/10 is the authority for this modification.

## GENERAL

5. **Modification Application.** This modification is applicable to the fleet of Truck, Flatbed, Heavy, MC3, Gun Tractor/Ammo Transporter w/Crane, w/Winch, Mack.
6. **Items Affected.** This modification includes changes to existing vehicle assemblies and sub-systems and the installation of new equipment as detailed below.
  - a. batteries;
  - b. battery box;
  - c. generator and power supply cable;
  - d. battery voltage sense relay; and
  - e. electrical spike/surge protector.

### 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.

7. **Priority – Group 2.** All applicable equipment is to be modified when next in workshop for repair or prior to issue from depot or pool stock.
8. **Action Required.** Demand through MILIS the replacement 100A 28 V generator, NSN 2920-66-095-0364.
9. Actions detailed in this instruction are to be performed by technical maintenance organisations authorised to carry out Light, Medium or Heavy Grade Repairs. The trades approved to complete this modification are ECN 418 – Technician Electrical and/or ECN 229 – Vehicle Mechanic, or civilian equivalents.

### 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.

- 10. Task Recording.** The incorporation of this modification is to be recorded as follows:
- in the vehicle's GM 120 (Record Book for Service Equipment), and
  - in MILIS using Standard Job Number 8156.
- 11. Estimated Work Hours.** For initial planning purposes only, it is estimated that this modification will take 8 hours to perform.
- 12. Stores Required.** One 100A 28 V generator (see Paragraph 8) and the Modification Kit (NIIN 66-159-2333). Table 1 list all items included in the Modification Kit.

**Table 1 Modification Kit, Mack Gun Tractor/Ammo Transporter – Electrical Power Upgrade**

Item	NSN	Mfr Part No	Designation or Description	UOI	Qty / Kit	Qty / Equip
1	8145-66-159-2177	DE253550017	Spacecase 1105545 modified	ea	1	
2	5940-01-571-3852	2104	Power bar, tin-plated copper, 4 x 3/8" UNC studs, with polycarbonate insulated base, 600 amp DC	ea	2	
3	5305-12-142-5578		Screw, pan head, steel, Phillips, M6 x 25 mm, zinc plated	ea	8	
4	5310-99-122-6474		Washer, flat, steel, M6 nominal bolt size, zinc plated	ea	18	
5	5310-66-144-6236		Nut, self locking, M6, zinc plated	ea	9	
6	6150-66-159-2326	DE253550037-2	Cable assembly, special purpose, negative bus bar to chassis, 35 mm <sup>2</sup> , with M6 and M10 lug ends, 580 mm long	ea	1	
7	5305-01-300-6263	B18231B06015N	Bolt, hex head, steel, M6 x 15 mm, zinc plated	ea	1	
8	6150-66-159-2328	DE253550033	Cable assembly, special purpose, electrical, battery negative to negative bus bar, 35 mm <sup>2</sup> , M10 lugs both ends, 350mm long	ea	1	
9	5945-66-152-1563	59MS29411M	Relay, solid state, voltage boost, 24 volt	Kit	1	
10	5920-66-152-1562	59MS29412M	Arrester, electrical surge 24 volt spike protector	Kit	1	
11	5940-66-159-2319	MA142HDN	Terminal post clamp, battery negative, M10 stud	ea	2	
12	5970-00-915-9186	RNF-100-1/2-RED	Tubing, heat-shrink, Raychem, RNF-100, red, 50 mm long	ea	1	
13	5310-00-527-3634	MS35335-61	Washer, lock, external tooth, M6, zinc plated	ea	2	
14	5940-66-159-2304	H1416	Lug, crimp, copper, 25 mm <sup>2</sup> cable, M10 hole	ea	2	
15	6150-66-159-2323	DE253550046	Cable assembly, special purpose, battery positive to positive bus bar, 35 mm <sup>2</sup> , M10 lugs both ends, 315mm long	ea	1	
16	5940-66-159-2320	MA142HDP	Terminal post clamp, battery positive, M10 stud	ea	2	
17	5310-99-135-4103		Washer, lock, steel, split helical ring, 10 mm bolt	ea	4	
18	5975-00-899-4606	MS3367-2-0	Cable tie, black, large, 300 mm long	ea	30	
19	5340-00-582-1819	SPN-16	P clamp, steel, zinc plated with santoprene cushion, 19 mm ID	ea	1	
20	3020-66-100-8615		Pulley, groove, 2 groove, AV13	ea	1	
21	6150-66-095-0371		Impeller fan, axial, electrical rotating equipment	ea	1	
22	5306-66-152-7981		Bolt, machine, round head, square neck, 5/16" UNC, 250 mm long	ea	2	
23	5999-66-152-7774		Clip, spring, battery hold-down bolt retainer	ea	2	
24	6160-66-159-1385	47RU39401M5	Board, battery box	ea	1	
25	6140-01-586-2764	Odyssey PC1750	Battery, 12 V dc, 74 amp-hour, lead acid, fully sealed, no maintenance	ea	2	
26	6160-66-159-2332	DE253550011	Bracket, battery clamping, steel, with spacer insert	ea	1	

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**Table 1 Modification Kit, Mack Gun Tractor/Ammo Transporter – Electrical Power Upgrade  
(continued)**

Item	NSN	Mfr Part No	Designation or Description	UOI	Qty / Kit	Qty / Equip
27	5310-01-147-9616		Washer, flat, steel, 11/32" ID, 45/64" OD, zinc plated	ea	4	
28	5310-00-829-9981	MS35649-2312	Nut, steel, 5/16" UNC, zinc plated	ea	4	
29	6150-66-159-2325	DE253550045	Cable assembly, special purpose, battery connect, 50 mm <sup>2</sup> , M10 lugs both ends, 340mm long	ea	1	
30	6150-66-159-2322	DE253550052	Cable assembly, special purpose, generator power output cable	ea	1	
31	5940-66-159-2306	H4240	Connector, crimp, M10 – red (0.5 – 1.5 mm <sup>2</sup> )	pkt	1	
32	5940-66-150-8837	H4229	Connector, crimp, M10 – blue (1.5 – 2.5 mm <sup>2</sup> )	pkt	1	
33	5940-66-150-8838	H4238	Connector, crimp, M10 – yellow (2.5 – 6.0 mm <sup>2</sup> )	pkt	1	

**13. Items to be Removed.** The items to be removed are listed in Table 2. All stores removed are to be processed in accordance with the ESCM.

**Table 2 Items to be Removed**

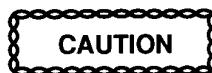
Item	NSN	Mfr Part No	Designation or Description	Qty per Equip
1	6140-66-122-7057	22FR530SMF	Battery storage, 12 V dc, 60 Ah min, 530 CA, sealed, maintenance free	2
2	6150-01-552-1521	46MK3510P8	Cable, jumper, complete	1
3			Bracket, bottom clamping	2
4	2920-66-095-0364		Generator, engine accessory, 100 A, 28 V dc complete with fan and pulley	1
5	6150-66-155-6148	X50MRA388	Cable assembly, special purpose, electrical branched wiring Harness	1
6	6150-01-552-0415	46MK452P15	Battery, cable assembly, battery to chassis, black, 15 IN long	1

**DETAIL**

**Preparation of the Vehicle**

**14.** The vehicle is to be prepared as follows:

- a. Classify the vehicle **'DO NOT USE – XX'** until the mechanical and wiring installations are complete.



The maximum charge voltage for the Odyssey PC 1750 batteries is not to exceed 15 V dc.

**NOTE**

The Odyssey PC 1750 has exceptional fast charge characteristics. There is no requirement to limit the charge current.

- b. Check the state of charge (SOC) of the replacement batteries (Table 1, Item 25). If the SOC of a battery is below 12.65 V, a boost charge is to be applied.

**Battery Box and Cable Modifications**

**15. Battery Box Preparation.** Prepare the battery box as follows:

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**WARNING**

**Always disconnect the negative (earth) cable from the vehicle batteries prior to commencing work.**

- a. Disconnect all wires that are connected to the negative terminal posts of the battery (note/tag identification for later reconnection).
- b. Disconnect all wires that are connected to the positive terminal posts of the battery (note/tag identification for later reconnection).

**NOTE**

Due to configuration anomalies, some vehicles are fitted with longer battery box support bracket legs. The longer brackets also use the outer battery clamp fasteners to secure the battery box.

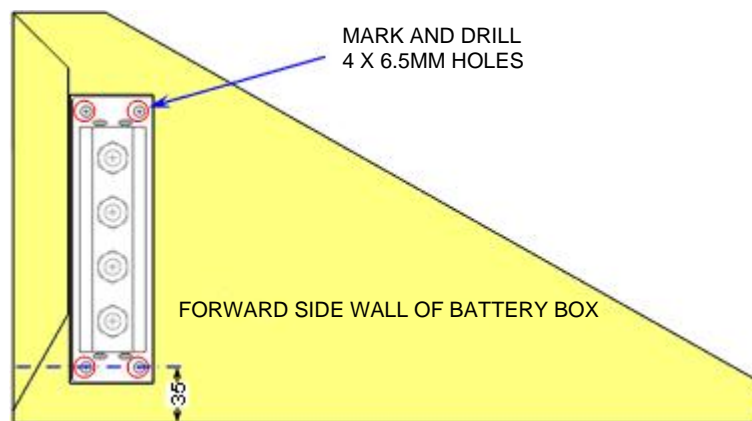
- c. Remove and discard the outer battery clamp. Refit and tighten the fasteners if they are used to secure the battery box to the support brackets, otherwise discard them.
- d. Remove the battery bridging cable and remove the batteries.
- e. Remove the battery negative terminal to chassis earth cable.
- f. Inspect and return or dispose of the batteries and the bridging cable as applicable.
- g. Cut all wiring cable ties within and immediately behind the battery box.
- h. Remove and discard the inner battery clamp bracket. Refit and tighten the fasteners.
- i. Remove any rubber matting that is glued or fastened to the base of the battery box.
- j. Inspect the battery box and lid for serviceability. Repair and refurbish as required to ensure the battery box body and lid are serviceable, clean, free of dents, cracks and rust and are correctly fitted before proceeding with this modification.

**16. Battery Box Modifications.** Complete the internal modifications as follows:

**NOTE**

The following procedures can be carried out without removing the battery box from the vehicle. Where considered appropriate, technicians may chose to partially or completely remove the battery box to facilitate this modification.

- a. Position one of the power bars (bus bars) (Table 1, Item 2) on the inside of the battery box on the right side wall, against the fold of the rear wall, as viewed from the driver's side of the vehicle. Adjust the position vertically so that the lower pair of bus bar mounting holes are 35 mm from the base of the battery box. Mark the location of the four bus bar mounting holes on the battery box side wall (Figures 1 and 2).



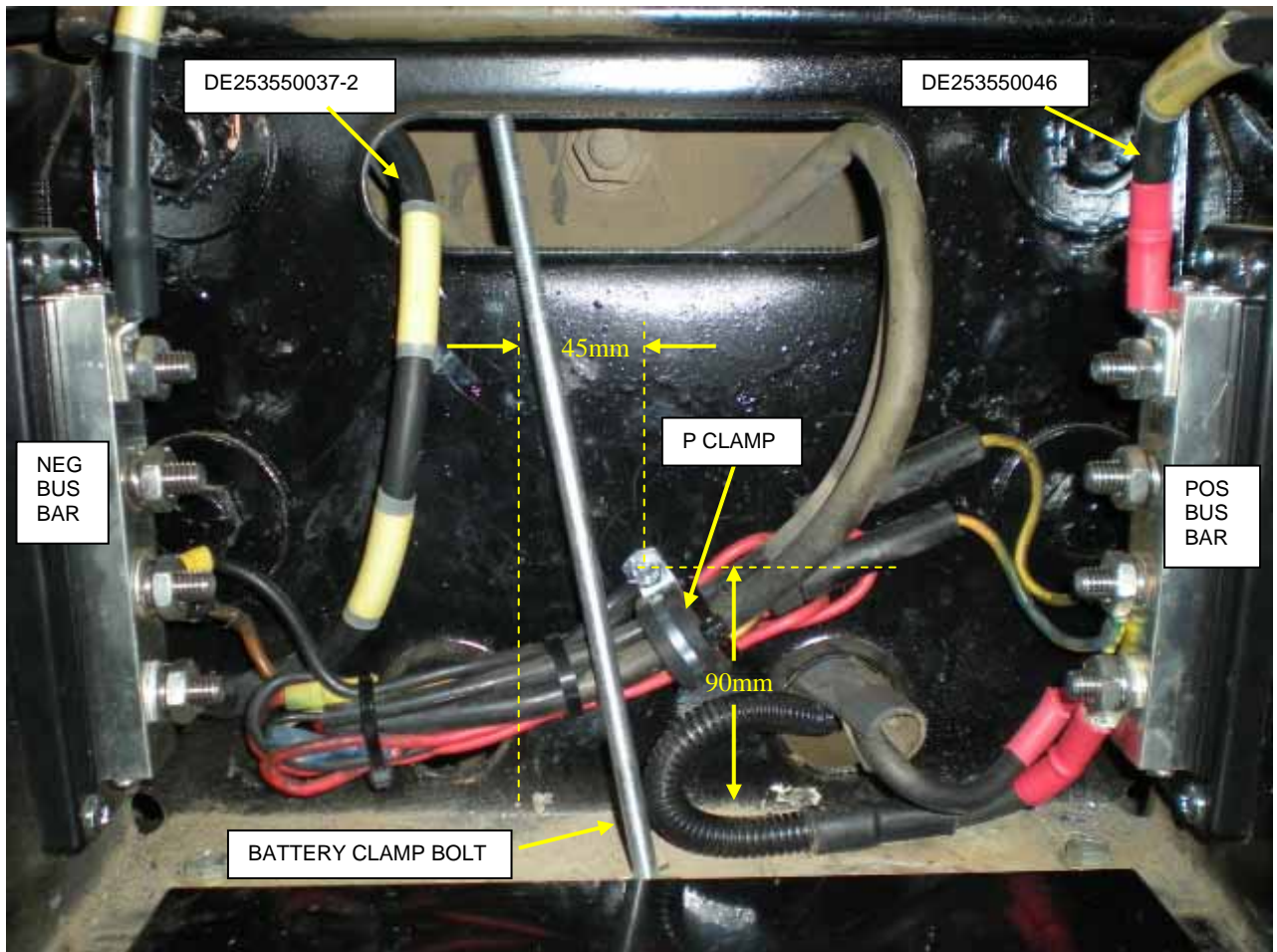
**Figure 1 Bus Bar Position**

- b. Repeat the previous step on the left side of the battery box wall for the second bus bar (Table 1, Item 2).
- c. Drill and de-bur the eight x 6.5 mm bus bar mounting holes.
- d. Mount the two bus bars utilising M6 x 25 mm screws (Table 1, Item 3) fitted with M6 flat washers and M6 self-locking nuts (Table 1, Items 4 and 5).

**NOTE**

For the remainder of this procedure, the bus bar on the right side wall is designated as the 'positive' (+24V) bus bar and the bus bar on the left side wall is designated as the 'negative' (earth) bus bar.

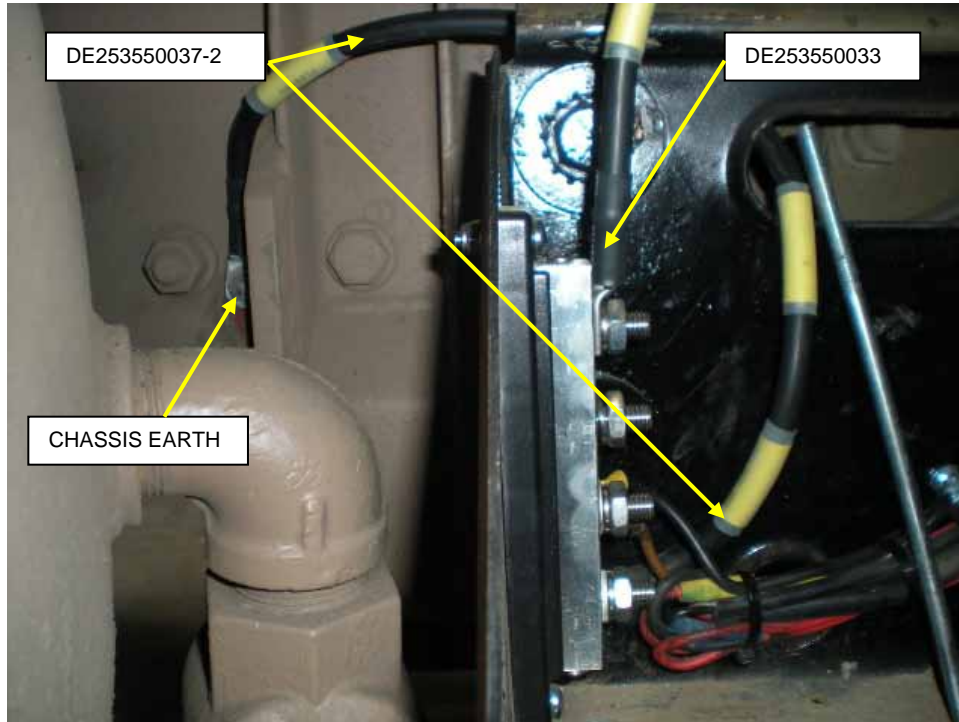
- e. Mark (45 mm from the forward edge of the lower left cable entry hole and 90 mm up from the battery box floor), drill and de-bur the 6.5 mm diameter 'P' clamp mount hole as shown in Figure 2.



**Figure 2 Battery Box Internal Layout**

17. **Battery Box Cabling.** Make the following cable connections (Figure 2):
- a. Connect the M10 lug of the chassis earth cable DE253550037-2 marked "Neg Bus Bar" (Table 1, Item 6) to the bottom stud on the negative bus bar. Set the lug at a 45 degree angle down towards the rear wall of the battery box. Route the free end of the cable out through the rear, upper cable slot in the wall of the battery box (Figures 2 and 3).
  - b. Identify an M6 bolt and nut in the chassis side rail within reach of the chassis earth cable (Figure 3).

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**Figure 3 Cable DE253550037-2 Negative Bus Bar to Chassis**

- c. Remove the bolt, nut and washers and retain for use later. Clean around the bolt hole back to bare metal on both sides of the chassis rail.
- d. Connect the M6 lug of cable DE253550037-2 to the chassis rail using the existing bolt, nut and washers. Fit the bolt with a toothed lock washer (Table 1, Item 13) on both sides of the chassis rail and a flat washer on each side of the cable lug.
- e. Connect the M10 lug (black sleeve) of cable DE253550033 (Table 1, Item 8) to the top stud on the negative bus bar. Align the lug so that it is vertical (Figure 3).
- f. Fit the battery negative terminal post clamp (Table 1, Item 11) to the battery negative cable DE253550033 with a spring washer (Table 1, Item 17) located between the bolt head and terminal lug.
- g. Connect the remaining negative cables as follows:
  - (1) If the remaining battery negative post connections (previously removed at Paragraph 15.a. have M10 connections fitted, proceed to Paragraph 17.g(4).
  - (2) Cut the remaining negative, battery terminal connections off at their ends.

#### NOTE

Due to anomalies in wiring cable size configuration, the supplied connectors for the following task may not be of the correct cable size. If the supplied connections are incorrect, the correct connections are to be obtained.

- (3) Strip back the insulations enough to fit the M10 crimp connections (Table 1, Item 31, 32 or 33) to the cables. Crimp the connections to the cables.
- (4) Connect the negative cables to the third stud down on the negative bus bar. Set the connections at a slight downward angle towards the rear wall of the battery box.
- h. Prepare the existing battery positive cable as follows:
  - (1) If the battery post end of the positive battery cable has an M10 cable lug, proceed to Paragraph 16. i.
  - (2) Cut the positive battery terminal post clamp off the end of the battery cable.



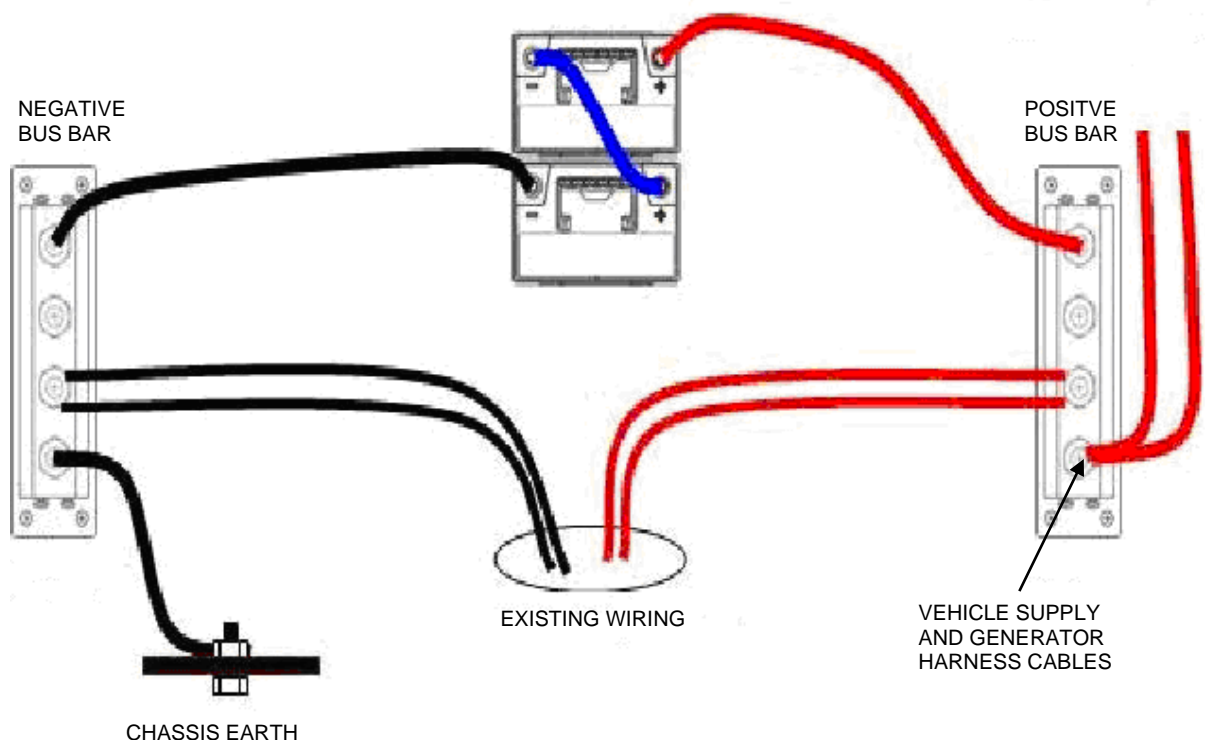
- (3) Strip back 20 mm of insulation and fit a pre-cut length of red heat shrink tubing (Table 1, Item 12) and an M10 lug (Table 1, Item 14) to the end of the cable. Crimp the lug into position and then shrink the heat shrink onto the lug.
- i. Ensure the battery positive to the firewall large terminal block cable (now the positive bus bar to the firewall large terminal block cable) enters the battery box via the lower, right-hand, battery box cable entry hole as viewed from the driver's side of the vehicle. Connect the cable onto the bottom stud of the positive bus bar and set the lug at a 45 degree angle down towards the rear wall of the battery box (Figure 2). Do not tighten the nut at this stage as the generator harness will also use this stud.
- j. Connect the M10 lug (red sleeve) of the battery positive to positive bus bar cable DE253550046 (Table 1, Item 15) to the top stud on the positive bus bar. Set the lug so that it is vertical (Figure 3).
- k. Fit the battery positive terminal post clamp (Table 1, Item 16) to the battery positive cable DE253550046 with a spring washer (Table 1, Item 17) located between the bolt head and terminal lug.
- l. Connect the remaining positive cables as follows:
  - (1) If the remaining battery positive post connections (previously removed at Paragraph 15.b) have M10 connections fitted, proceed to Paragraph 17.l(4).
  - (2) Cut the remaining battery positive terminal connections off at their ends.

**NOTE**

Due to anomalies in wiring cable size configuration, the supplied connectors for the following task may not be of the correct cable size. If the supplied connections are incorrect, the correct connections are to be obtained.

- (3) Strip back the insulations enough to fit the M10 crimp connections (Table 1, Item 31, 33 or 34) to the cables. Crimp the connections to the cables.
- (4) Connect the positive cables to the third stud down on the positive bus bar. Set the connections at a slight downward angle towards the rear wall of the battery box.

- 18. Route the wiring through the 'P' clamp (Table 1, Item 19) and fit the 'P' clamp with fasteners (Table 1, Items 4, 5 and 7) as shown in Figure 2.
- 19. Inspect the layout and tightness of all electrical connections (the battery box wiring is shown in (Figure 4)).



**Figure 4 Battery Box Wiring Arrangement**

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### Generator, Generator Harness and Sense Line Upgrade

20. **Generator.** Replace the generator as follows:

#### WARNING

The generator is heavy (22kg) and must be handled with care to avoid injuries to fingers and/or hands during removal and installation.

- a. Remove the existing generator in accordance with EMEI Vehicle G 703.
- b. Fit the pulley and impeller fan (Table 1, Item 20 and 21) to the new generator.
- c. Install the new generator in accordance with EMEI Vehicle G 703. Leave the generator set at 100A as opposed to 40A in EMEI Vehicle G 703. Do not reconnect the cannon plug at this stage.

21. **Generator Harness.** Replace the existing generator harness with the new generator harness DE253550052 (Table 1, Item 30) as follows:

- a. Remove the air induction hose/duct from the left-hand air cleaner to tip turbine.

#### NOTE

The following references to 'terminal posts' are numbered from the top to bottom post on the large terminal block that is located in the engine compartment on the left side of the firewall.

- b. Disconnect the generator harness positive supply cable from the 11<sup>th</sup> terminal post. Refit the fasteners but do not tighten at this stage as this terminal post will be used later (Figure 5).

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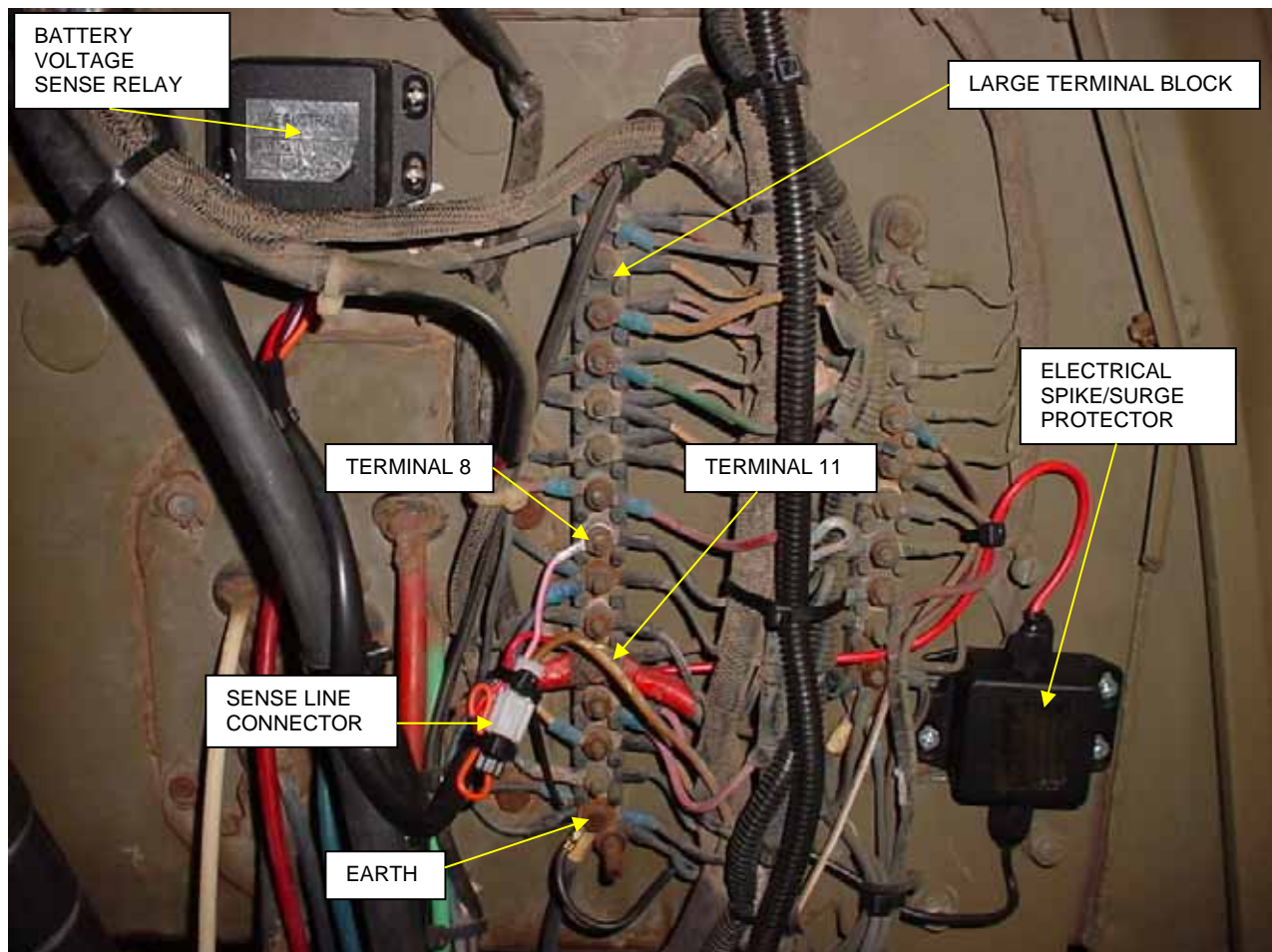


Figure 5 Firewall Component Layout

- c. Disconnect the white/brown wire (voltage sense line from the generator harness) from the 8<sup>th</sup> terminal post (Figure 5). Refit the fasteners but do not tighten at this stage as this terminal post will be used later.

**NOTE**

Prior to removing the sense line, identify where it is routed as the new sense line wire will be secured along a similar path.

- d. Remove the generator harness positive supply cable and sense line wire from their securing points.
- e. Remove the fasteners that attach the generator harness negative cable terminal to the chassis. Retain the fasteners for use later.
- f. Remove the generator harness from the vehicle.
- g. Connect and tighten the cannon plug of the new generator harness DE253550052 to the generator.
- h. Fit the generator harness negative cable terminal to the chassis rail where the previous negative cable was removed from. Use the previously removed fasteners and tighten them ensuring that the mounting point provides a good earth.

**NOTE**

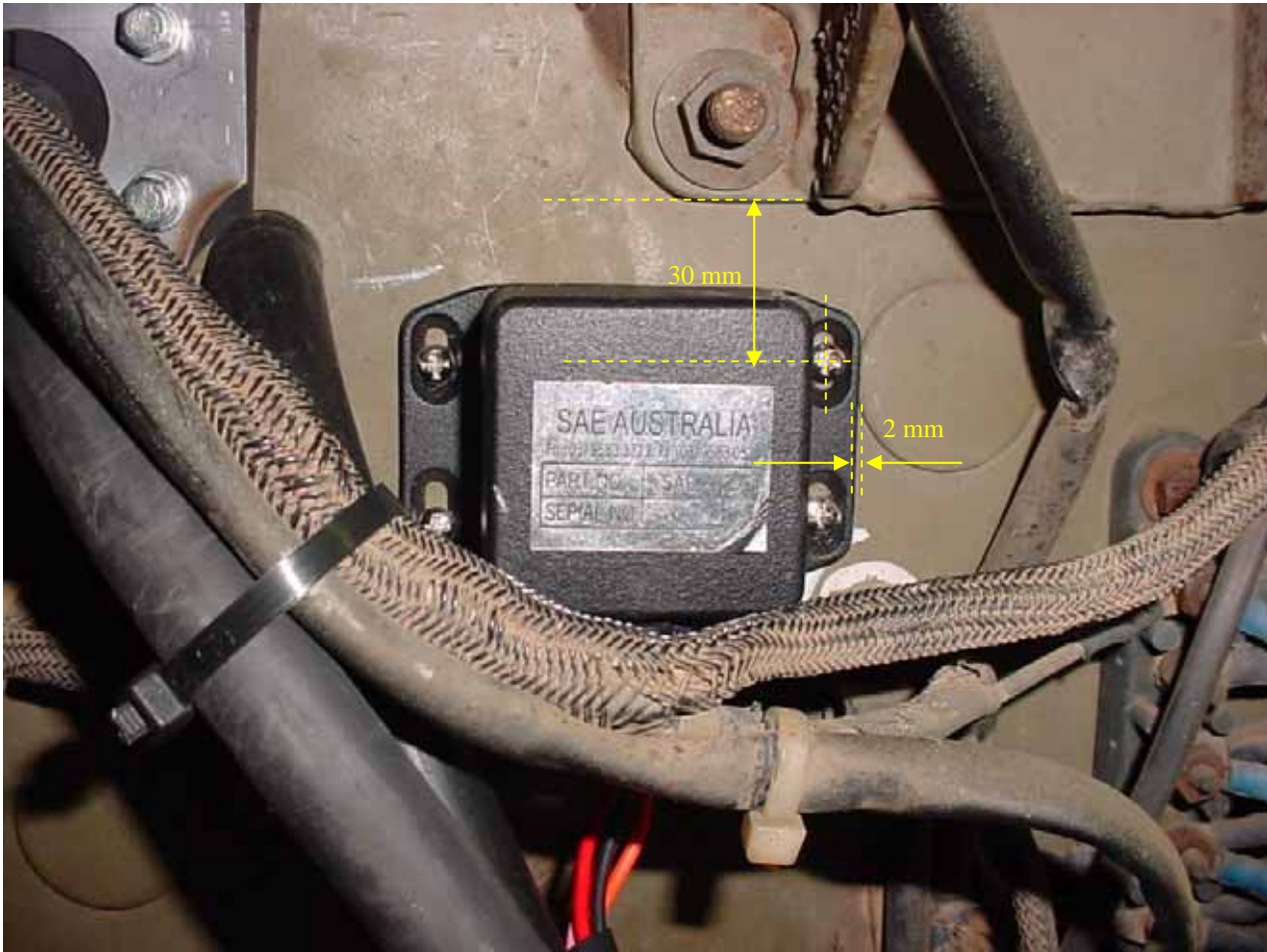
The new generator harness positive supply cable will not be connected to the terminal block. It will be connected to the positive bus bar that is located in the battery box.

The generator harness voltage sense line will be routed up the firewall and connected later within this instruction.

- i. Continue the harness along the inside of the chassis rail to the point where the voltage sense line and generator positive supply cable separate. At this point, following the path of the battery supply cable from the battery box, continue the generator positive supply cable along the chassis rail and across the cross member to the battery box.
- j. The generator harness positive supply cable is to enter the battery box via the lower, right-hand cable entry hole as viewed from the driver's side of the vehicle. The cable is to be connected to the bottom stud of the positive bus bar (any excess cable is to be looped and secured within the inside of the chassis rail).
- k. Prior to tightening, ensure both the battery positive to the firewall large terminal block cable and the generator harness positive supply cable lugs are set at a slight downward angle towards the rear wall of the battery box (Figure 2).
- l. Ensuring the generator harness follows a path that will protect it from damage, cable tie (Table 1, Item 18) the harness to the existing cables at points no less than 600 mm apart.

**22. Install the Battery Voltage Sense Relay.** Fit the new battery voltage sense relay as follows:

- a. Fit the crimp connector (supplied in the Battery Voltage Sense Relay kit Table 1, Item 9) to the black wire of the relay.
- b. Locate the Battery Voltage Sense Relay in the engine bay on the left side of the firewall, as shown in Figure 6.



**Figure 6 Battery Voltage Sense Relay**

- c. Mark the position of the four relay mount holes as depicted in Figure 6.



**Ensure the drill bit does not penetrate the firewall by more than 10mm.**

- d. Drill and de-bur the four x 2.5 mm relay mounting holes in the firewall.  
e. Secure the relay to the firewall using the four self tapping screws supplied in the kit as shown in Figure 6.

- 23. Connect the Battery Voltage Sense Relay.** Connect the battery voltage sense relay as follows:

**NOTE**

The following references to 'terminal posts' are numbered from the top to the bottom post on the large terminal block that is located in the engine compartment on the left side of the firewall (Figure 5).

- a. Route the red wire from the relay and connect it to the 11<sup>th</sup> terminal post (battery positive) on the large terminal block (do not tighten at this stage as the spike/surge protector positive wire, fitted later in this instruction, will also use this terminal).  
b. Route the pink wire from the battery voltage sense relay and connect it to the 8<sup>th</sup> terminal post on the large terminal block and secure in place.  
c. Secure the black terminal wire (earth) from the battery voltage sense relay to the large terminal block lower mount (earth, Figure 5).

- d. Route the sense line up from its break-out point from the generator harness (following the route of the previously removed sense line) and connect it to the orange wire of the battery voltage sense relay (Figure 5).
- e. Cable tie (Table 1, Item 18) the sense line to the existing cable/airlines. Any excess cable can be pulled back along the chassis rail.
- f. Secure the wires with cables ties as required.

### Electrical Spike/Surge Protector

24. **Install the Electrical Spike/Surge Protector.** Fit the new electrical spike/surge protector as follows:



**Accidental reversal of electrical connections during installation will destroy the unit and overheat the conducting wire. Check polarity carefully.**

- a. Fit the crimp connectors (supplied in the Spike/Surge Protector kit Table 1, Item 10) to the red and black wire of the Spike/Surge Protector.
- b. Locate the spike protector (Table 1, Item 10) on the firewall in the position shown in Figures 5 and 7 and mark the location of the four spike protector mount holes.

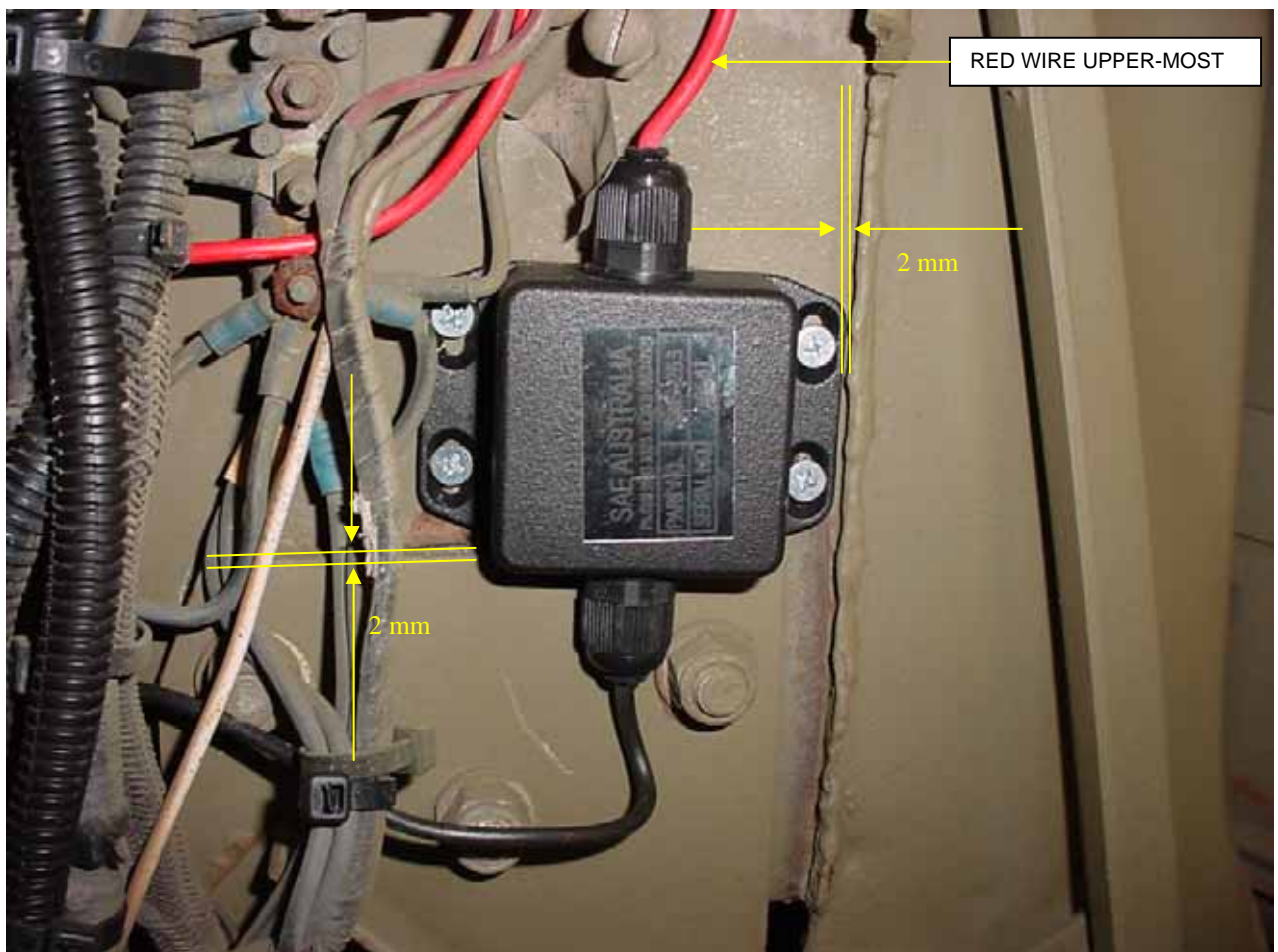


Figure 7 Spike/Surge Protector

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**Ensure the drill bit does not penetrate the firewall by more than 10mm.**

- c. Drill and de-bur the four x 2.5 mm spike protector mounting holes in the firewall.

**NOTE**

When securing the spike protector, ensure that the red wire is in the upper-most position (Figure 7).

- d. Secure the spike/surge protector to the firewall using the self tapping screws supplied in the kit.

**25. Connect the Spike/Surge Protector.** Connect the spike/surge protector as follows:

- a. Remove the previously fitted nut and the battery positive cable from the 11<sup>th</sup> terminal post of the large terminal block (ensure the previously fitted battery voltage sense wire remains in place). Connections to the 11<sup>th</sup> terminal are as follows:
  - (1) route the red wire, from the spike protector, under the existing wiring looms and connect it (with the previously fitted battery voltage sense wire) to the post; and
  - (2) refit and secure the previously removed battery positive cable and nut to the post.
- b. Route the black wire, from the spike protector, under the existing wiring looms and secure to the large terminal block, lower mount - earth (Figure 5).
- c. Secure the wires with cable ties as required.
- d. Re-install and secure the air induction hose/duct to the left-hand air cleaner and tip turbine.

**26.** Inspect the layout and tightness of all electrical connections.

**Installation of New Batteries**

**27.** Carry out the following actions to fit and secure the supplied batteries:

- a. Fit the square-necked hold-down bolt (Table 1, Item 22) through the rear square bolt hole in the battery box base (Figure 2). Keep the bolt in position with an 11/32 in flat washer (Table 1, Item 27) and retaining spring clip (Table 1, Item 23).

A rectangular icon with a black background and white border containing the word "WARNING" in bold, uppercase letters.

**WARNING**

**Ensure the insulating covers on the battery terminal posts are left in place until you are ready to make a connection onto the post.**

- b. Place the battery base board (Table 1, Item 24) centrally on the floor of the battery box between the two hold-down bolts. If required cut out/relieve the base board, in the vicinity of the battery box two outer mount bolts, sufficiently to allow the board to lay flat on the battery box floor.
- c. Position the two new batteries (Table 1, Item 25) on the board in the orientation shown in Figures 8 and 9. When correctly seated, the rear battery is centrally positioned so that it is equally distanced between and lightly touching the Positive and Negative bus bars.

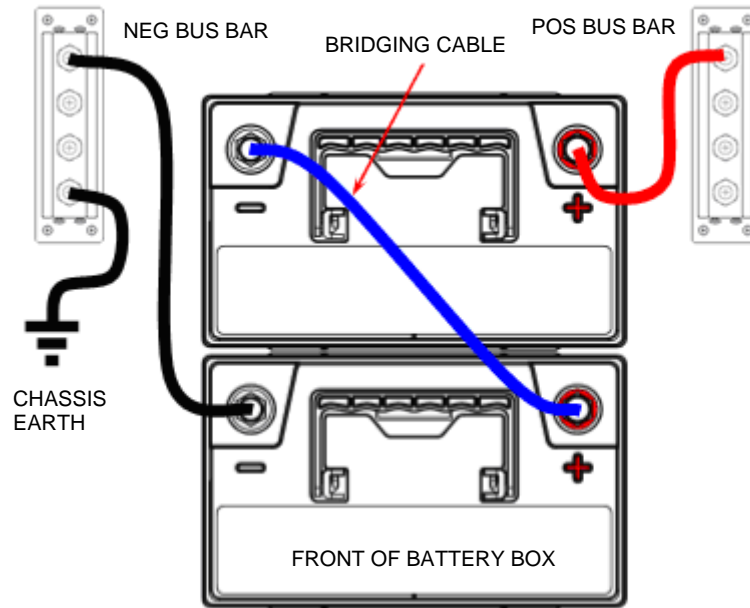


Figure 8 Battery Orientation and Connections - 1



Figure 9 Battery Orientation and Connections - 2

- d. As depicted in Figure 9, fit the other square-necked hold-down bolt (Table 1, Item 22) through the front square bolt hole in the battery box base. Keep the bolt in position with a 11/32 in flat washer (Table 1, Item 27) and retaining spring clip (Table 1, Item 23).

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- e. Fit the battery clamp (Table 1, Item 26). Lightly secure the batteries in place with an 11/32" flat washer (Table 1, Item 27) and a 5/16" UNC nut (Table 1, Item 28) on each hold-down bolt.
- f. Tighten the nuts on the hold-down bolts one and a half turns beyond finger tight. Check (and re-tighten if necessary) that the batteries are securely held in position, ensure there is no distortion of the battery case. Fit a second 5/16" UNC nut (Table 1, Item 28) to each bolt and securely lock them in place.
- g. Fit the battery negative and positive terminal post clamps (Items 11 and 16) to the bridging cable (Item 29) with a spring washer (Table 1, Item 17) located between the bolt heads and terminal lugs.
- h. Connect the bridging cable assembly from the negative terminal on the rear battery to the positive terminal on the front battery (Figures 8 and 9).
- i. Connect the battery positive cable to the positive terminal on the rear battery.
- j. Check that all of the vehicles' electronic switches and the ignition switch are in the OFF position. Connect the negative battery cable to the negative terminal on the front battery.
- k. Inspect the layout and tightness of all electrical connections.

## MODIFICATION TESTING AND RECORDING

### Battery Charging Test

28. Test the battery charging circuit as follows:

- a. Connect a voltmeter across the 24 V positive and negative battery terminals. The meter reading should be above 25.3 V dc (battery voltage). If not a boost charge is recommended (refer Paragraph 14.b and preceding **CAUTION** and **NOTE**).
- b. Start and run the vehicle at fast idle (1500 rpm) with no additional electrical loads applied.
- c. The Voltmeter reading should be  $28.3 \pm 0.1$  V dc.
- d. With the engine running at fast idle; switch on the vehicle headlights and observe the reading on the voltmeter. An observed output voltage of  $28.3 \pm 0.1$  V dc should be maintained.
- e. Switch off the vehicle.
- f. If the observed reading is outside the above parameters then the generator/electrical charging system must be diagnosed/adjusted/repaired/replaced in accordance with EMEI Electrical P 413.
- g. Refit the battery box lid.

### Recording Action

29. On completion of the modification, the following action is to be taken in accordance with TRAMM-L:

- a. Deface numeral 56 on the modification record plate.
- b. Complete the modification details in part two of the GM 120 – Record Book for Service Equipment.
- c. Update the MILIS MSE600 record, Mod Strike Number 56.
- d. Reclassify the vehicle.

**END**

Distribution List: **VEH G 56.0 – Code 2** (Maint Level)  
(Sponsor: CGSVSPO, Med/Hvy B Vehicles)  
(Authority: ECO CGSVSPO 100/10)