

TRUCK, LIGHTWEIGHT AND TRUCK, LIGHT - ALL TYPES - LAND ROVER 110 4X4 AND 6X6

RECLAMATION OF PANHARD ROD, LOWER LINK AND RADIUS ARM MOUNTS

MISCELLANEOUS 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 describes the methods used to reclaim the panhard rod mount and radius arm mounts on 4X4 and 6X6 variants, and the rear axle lower link mounts on 4X4 variants.
2. The reclamation procedures detailed in this instruction are to be used when wear is found in these mounting points.
3. Most 4X4 and 6X6 variants were originally manufactured using front axle housings that have narrow-type radius arm mounting brackets (i.e. 49 mm between the locating plates). Axle housings now supplied as replacement parts have wide-type radius arm mounting brackets (i.e. 55 mm between the locating plates). This makes them unsuitable for use on vehicles originally fitted with axle housings that have narrow type-mounting brackets unless they have been modified.
4. The modification of installing spacers to the inside of the locating plates, to reduce the internal width of the opening (described in EMEI Vehicle G 189-14) is considered to be a satisfactory method of reclaiming worn locating plate holes. The reclamation process for radius arm mounts described in this instruction is only to be used on axle housings having the narrow-type mounts (i.e. 49 mm between the locating plates).

Associated Publications

5. Reference may be necessary to the latest issue of the following documents:
 - a. [AS/NZS 1554.1](#) Structural Steel Welding – Part 1: Welding of Steel Structures;
 - b. [AS/NZS 2717.1](#) Welding – Electrodes – Gas Metal Arc – Ferritic Steel Electrodes;
 - c. [AS/NZS 4855](#) Welding Consumables – Covered Electrodes for Manual Metal Arc Welding of Non-alloy and Fine Grain Steels;
 - d. [Defence Supply Chain Manual \(DSCM\)](#), Volume 4, Section 3 – Supply Management Processes, Stores Accounting General;
 - e. [EMEI Vehicle G 104-1](#) – Truck, Utility, Lightweight and Truck, Utility, Lightweight, Winch, MC2 – Land Rover 110 4x4 – Medium Grade Repair;
 - f. EMEI Vehicle G 189-14 – Truck, Lightweight and Truck, Light – All Types – Land Rover 110 4x4 and 6X6 – Modification of Radius Arm Mounts on Front Axle Housings;
 - g. [EMEI Vehicle G 204-1](#) – Truck, Cargo, Light and Truck, Cargo, Light, Winch, MC2 – Land Rover 110 6x6 – Medium Grade Repair;
 - h. EMEI Workshop J Series – Welding and Cutting Equipment;
 - i. [Material Safety Data Sheet \(MSDS\)](#);
 - j. [SAFETYMAN](#) – Defence Safety Manual; and
 - k. [Technical Regulation of Army Materiel Manual \(TRAMM\)](#).

GENERAL

Application

6. The reclamation procedures are to be applied to axle assemblies whenever the holes in the mounting plates have worn more than 1.5 mm at the mountings for:

- a. the panhard rod;
- b. the radius arms on axle housings having the narrow-type mounts; and
- c. the rear lower links.

Action Required

7. Actions detailed in this instruction are to be performed by technical maintenance organisations authorised to perform Light, Medium and Heavy Grade Repairs. The procedure is to be conducted only by the following tradespeople:

- a. Vehicle Mechanic - ECN 229-2;
- b. Metalsmith - ECN 235-2; or
- c. civilian equivalent.

8. All welding workmanship is to be in accordance with the guidelines stated in AS/NZS 1554.1, Section 5.

9. All welds produced during performance of this instruction are to be visually inspected in accordance with AS/NZS 1554.1, Section 6, Table 6.2.2 (SP).

Estimated Workhours

10. For initial planning purposes only, the estimated time required to reclaim each of these mounts is:

- a. panhard rod mount - 1.5 hours;
- b. radius arm mounts - 2.5 hours; and
- c. rear lower link mount - 2.5 hours.

Stores Required

11. The stores required are shown in Table 1 and should be ordered on an **as required** basis.

Table 1 Stores Required

Item	NSN	Manufacturer Part No	Description	Qty Per Kit	Qty Per Equipment
1	2590-66-128-8450	AYG 7455	Kit, Fixings, Front Axle Panhard Rod Bracket (comprised of Items 1a – 1d)		1
1a		AYG 7488	Spacer, 27 mm OD, 14 mm ID, 6 mm thk	1	
1b		NH 114041	Nut, Metric, 14 mm	1	
1c		NT 114041	Locknut, Metric, 14 mm	1	
1d		AYG 6093	Bolt, M14, Class 8.8, 83 mm lg	1	
2	2590-66-128-8451	AYG 7456	Kit, Fixings, Front Axle Radius Arm Bracket (comprised of items 2a – 2d)		1
2a		AYG 7446	Spacer to suit 5/8 in bolt, 27 mm OD, 6 mm thk	4	
2b		NH 610041	Nut, 5/8 in UNF	4	
2c		NH 610321	Bolt, 5/8 in, 18 TPI, UNF, 4 in lg	4	
2d		NT 610041	Locknut, 5/8 in UNF	4	
3	2590-66-128-8441	AYG 7457	Kit, Fixings, Rear Axle Lower Link Bracket (comprises items 3a – 3b)		2
3a		AYG 7446	Spacer to suit 5/8 in bolt, 27 mm OD, 6 mm thk	2	
3b		NH 610041	Nut, 5/8 in UNF	2	

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Table 1 Stores Required (Continued)

Item	NSN	Manufacturer Part No	Description	Qty Per Kit	Qty Per Equipment
3c		BH 610361	Bolt, 5/8 in, 18 TPI, UNF, 4 1/2 in lg	2	
3d		NT 610041	Locknut, 5/8 in UNF	2	

WARNING

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

Do not work on the vehicle without the use of an axle stand beneath the axle. Place the axle stand as close to the raised wheel as possible. This procedure is required for all repairs and maintenance activities involving positioning of body parts in potential crush zones of the vehicle. Failure to comply may result in serious injury or death.

DETAIL

Reclamation Procedures

12. Panhard Rod Mount. The panhard rod axle mount reclamation is to be carried out as detailed in the following vehicle mechanic and metalsmith tasks:

- a. Vehicle mechanic tasks:
 - (1) Remove the locknut and bolt securing the panhard rod to the chassis mounting arm.
 - (2) Remove the locknut and bolt securing the panhard rod to the axle casing and remove the panhard rod from the vehicle.
- b. Metalsmith tasks:
 - (1) Using a grinder or file, clean the outside surfaces of the panhard rod mount.
 - (2) Fit Items 1a, 1b and 1d from Table 1, item 1 into the axle case mounts (Figure 1) and tighten them firmly.

NOTE

Ensure that the mounting bolt is installed from front to rear and is parallel to the axle casing centre line before welding the spacer and nut into place.

- (3) Fillet weld the front washer to the front axle case mount and the rear nut to the rear axle case mount, as shown in Figure 1 with a 3 mm continuous fillet weld, using either:
 - (a) Manual Metal Arc Welding (MMAW) process using electrodes conforming to AS/NZS 4855: E4918; or
 - (b) Gas Metal Arc Welding (GMAW) process using consumables conforming to AS/NZS 2717.1: ES6-GC/M-W503AH and shielding gas conforming to AS 4822:SG-ACO-16/2.75.
- (4) Remove the bolt and paint all bare metal surfaces.
- c. Vehicle mechanic tasks:
 - (1) Inspect the panhard rod bushes for useability and replace them if required.
 - (2) Install the panhard rod to the chassis mounting arm.
 - (3) Refit the bolt and locknut (do not tighten).
 - (4) Install the panhard rod to the front axle case mount.
 - (5) Install the bolt (Table 1, item 1d) and locknut (item 1c) but do not tighten it.
 - (6) Torque the bolt securing the panhard rod to the chassis mounting arm to 196 N.m (145 lbf.ft).

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- (7) Torque the bolt securing the panhard rod to the axle casing to 176 N.m (130 lbf.ft) and secure the locknut.

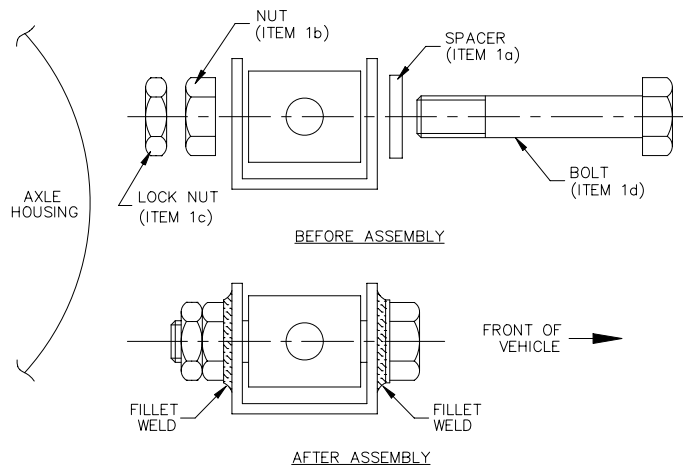


Figure 1 Panhard Rod Mount

13. Radius Arm Mount. The radius arm axle assembly mount reclamation is to be carried out as detailed in the following vehicle mechanic and metalsmith tasks:

a. Vehicle mechanic tasks:

- (1) Slacken the front wheel nuts.
- (2) Using a hydraulic jack, raise the front of the vehicle and support it on stands positioned beneath the chassis rails.
- (3) Support the axle weight using a jack.
- (4) Remove the front wheel nuts and wheels.
- (5) Remove the locknuts, washers and rubber bushes from the chassis end of the radius arm.
- (6) Using special tool (18G1063) NSN 5120-66-128-4304, Separator, Ball Joint, disconnect the tie rod ball joints at the steering arms.
- (7) Remove the locknuts and bolts securing the radius arms to the axle case.
- (8) Lower the front end of the radius arms to clear the axle and withdraw the arms from the chassis brackets.

b. Metalsmith tasks:

- (1) Using a grinder or file, clean the outside surface of the axle assembly mounts for the radius arms.
- (2) Fit Items 2a, 2b and 2c from Table 1 to the axle case mounts, ensuring that the bolts are installed from the inside facing out and are parallel to the axle casing (Figure 2).
- (3) Tighten the bolts firmly.

NOTE

Ensure bolts are installed from inside to outside and are parallel to the axle casing centre line before welding the spacer and nut into place.

- (4) Weld the inside spacers and outside nuts to the axle casing mounts, as shown in Figure 2, with a 3 mm continuous fillet weld using either:
 - (a) Manual Metal Arc Welding (MMAW) process using electrodes conforming to AS/NZS 4855: E4918; or
 - (b) Gas Metal Arc Welding (GMAW) process using consumables conforming to AS/NZS 2717.1: ES6-GC/M-W503AH and shielding gas conforming to AS 4822:SG-ACO-16/2.75.
- (5) Remove the bolts and paint all bare metal surfaces.

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- c.** Vehicle mechanic tasks:
- (1)** Inspect the radius arm bushes for useability and replace them as sets (if required).
 - (2)** Install a cup washer and rubber bush on the radius arm.
 - (3)** Insert the radius arm into the chassis bracket.
 - (4)** Install the remaining rubber bush, cup washer and nut but do not tighten it.
 - (5)** Raise the front end of the radius arm and locate the bushes in the axle casing.
 - (6)** Install the two bolts and nuts (Table 1, items 2c and 2d) but do not tighten them.
 - (7)** Install the front wheels and wheel nuts.
 - (8)** Lower the vehicle to the ground and allow the suspension to settle.
 - (9)** Tighten the wheel nuts.
 - (10)** Torque the nuts and bolts securing the radius arms to the axle case and chassis bracket to 176 N.m (130 lbf.ft).
 - (11)** Install the tie rods and torque the ball joint nuts to 41 N.m (30 lbf.ft).

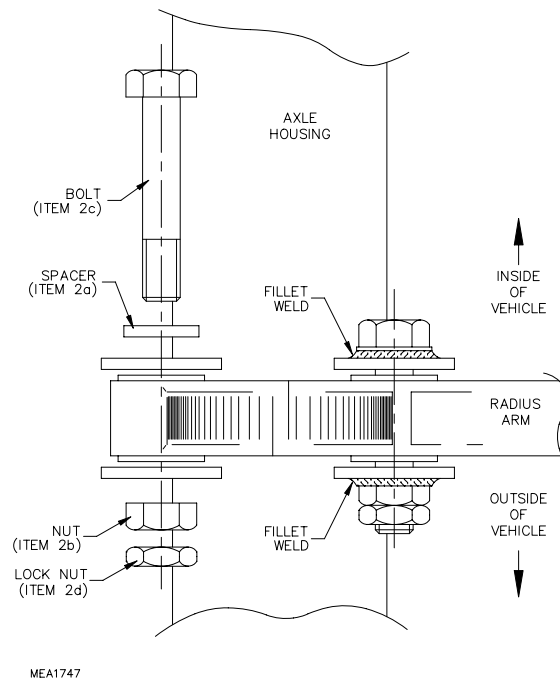


Figure 2 Radius Arm Mounts

14. Rear Lower Link Mount. The rear lower link axle mount reclamation is to be carried out as detailed in the following vehicle mechanic and metalsmith tasks:

- a.** Vehicle mechanic tasks:
- (1)** Using a hydraulic jack, raise the rear of the vehicle and support it on stands positioned beneath the chassis rails.
 - (2)** Support the axle weight with the jack.
 - (3)** Remove the locknut and bolt securing the rear lower link to the axle bracket.
 - (4)** Remove the locknut and flat washer securing the rear lower link to the chassis bracket and withdraw the link from the bush.
- b.** Metalsmith tasks:
- (1)** Using a grinder or file, clean the outside surfaces of both the lower link mounts on the axle casing.
 - (2)** Fit Items 3a, 3b and 3c from Table 1 to the axle case mounts (Figure 3), ensuring that the bolt is installed from inside to out and is parallel to the axle casing centre line.

- (3) Tighten the bolt firmly.

NOTE

Ensure that the mounting bolt is installed from inside to outside and is parallel to the axle casing centre line before welding the spacer and nut into place.

- (4) Weld the inside washer and the outside nut to the axle casing mount, as shown in Figure 3, with a 3 mm continuous fillet weld, using either:
 - (a) Manual Metal Arc Welding (MMAW) process using electrodes conforming to AS/NZS 4855: E4918 ; or
 - (b) Gas Metal Arc Welding (GMAW) process using consumables conforming to AS/NZS 2717.1: ES6-GC/M-W503AH and shielding gas conforming to AS 4822:SG-ACO-16/2.75.
 - (5) Remove the bolts and paint all bare metal surfaces.
- c. Vehicle mechanic tasks:
- (1) Inspect the lower link bushes for useability and replace them if required.
 - (2) Insert the lower link in the chassis bracket bush.
 - (3) Install the flat washer and a new locknut but do not tighten it.
 - (4) Position the lower link into the axle casing mount.
 - (5) Install the bolt (Table 1, Item 3c) and locknut (Table 1, Item 3d), but do not tighten it.
 - (6) Lower the vehicle to the ground and allow the suspension to settle.
 - (7) Torque the retaining bolt at the axle end of the link to 168–186 N.m (124-137 lbf.ft).
 - (8) Torque the locknut securing the link to the chassis bracket bush to 176 N.m (130 lbf ft).

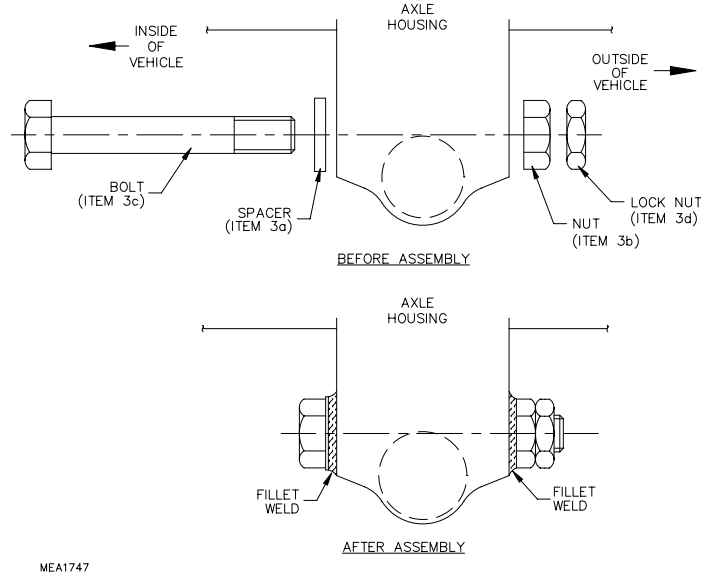


Figure 3 Rear Lower Link

Recording Action

15. On completion of the work enter the details of the reclamation in the vehicle Record Book for Service Equipment (GM 120).

END

Distribution List: **VEH G 16.0 – Code 2** (Maint Level)
(Sponsor: LV SPO, Lt B Veh)
(DMO Job No: 200501556)