



Installation Guide
Sports Differential Cover



INSTALLATION GUIDE

HARROP SPORTS DIFFERENTIAL COVER



For 60 years Harrop Engineering has been at the forefront of designing, developing and manufacturing precision performance components. Today our innovative and logical approach is applied to low volume automotive OEMs and the performance aftermarket through a dedicated team of 65 staff. Core performance products include Superchargers, Engine Components, Brakes, Differentials and we are also the exclusive Australian Distributor for Forgeline Motorsport Wheels & Lingenfelter Performance Parts.

Harrop are also the preferred supplier of Eaton Supercharger and Traction Control technology including dual branded product designed and manufactured in-house. There are currently over 4000 components in our portfolio and this is growing daily as we continually develop more Harrop Performance Products.

Our high profile car manufacturing customers include Holden, HSV, FPV, Roush and Lotus.

We also supply to race teams from categories including F1, NASCAR and V8 Supercars and an extensive range of drag, circuit and off-road competitors. Just as importantly, a large portion of our customers are performance enthusiasts and weekend warriors who are highly passionate about their ride.

Please take a moment to review the following pages and learn why Harrop is the first choice in performance products.

Thank you for choosing Harrop and enjoy your Harrop enhanced ride.

- Team HARROP



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ATTENTION: READ BEFORE PROCEEDING



IMPORTANT INFORMATION

Installing this product indicates your acceptance of the responsibility and liability associated with the fitment and use of this product. Please ensure the owner and drivers of the vehicle are aware of their responsibilities and liabilities as indicated below.

Warranty

This Sports Differential Cover is covered by a limited warranty on components and workmanship for a period of 12 months from the date of purchase, subject to the following:

- Installation must be completed by a qualified motor mechanic or technician who has undertaken appropriate training in fitting Harrop products.
- The enhanced vehicle has been driven in accordance with the conditions specified by the vehicle manufacturer's normal use of operation, driving care & service program.
- The enhanced vehicle has not been used for competitive racing.

Please refer to Harrop Engineering's full warranty terms and conditions and applicable warranty registration forms which can be found at www.harrop.com.au.

This document is meant only as a guide, as any vehicle modification should be completed by a certified technician who has the relevant experience and equipment to be competent of a safe and effective enhancement product installation.

A more in-depth guide with pictures will be produced (check www.harrop.com.au for updates), but the following notes will highlight most of the primary steps needed during the installation of a Sports Differential Cover kit.

Please ensure the safe operation of all tools and equipment are adhered to in accordance with the vehicle and equipment manufacture's recommendation.

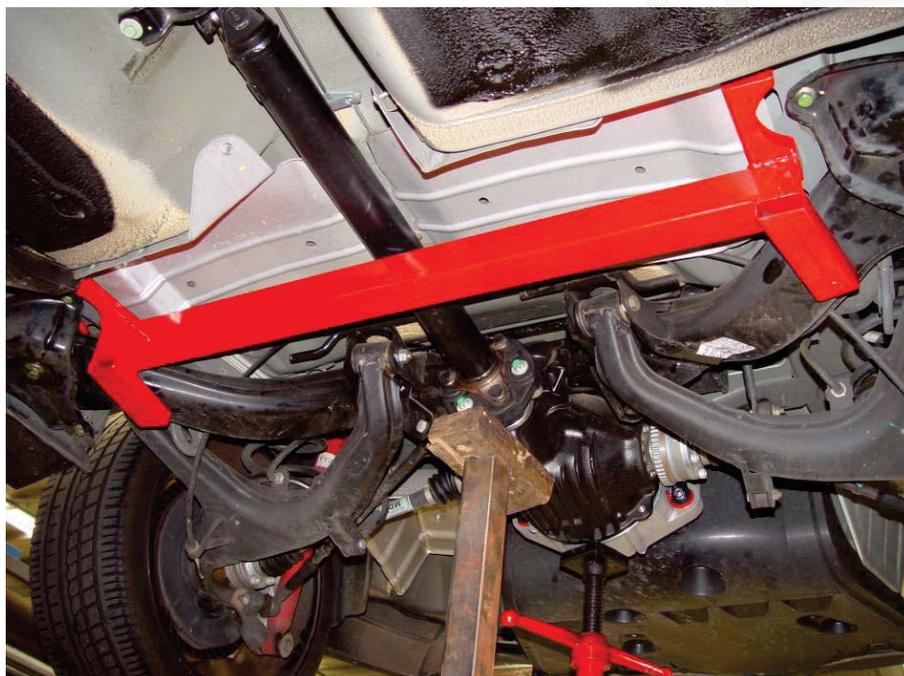
IMPORTANT INFORMATION REGARDING THE INSTALLATION OF THE DIFFERENTIAL COVER

The correct aligning tool as recommended by Holden (#AU458, (or USA: #CH-46839)) should be used to ensure that the sub-frame is aligned to the chassis, regardless of whether or not the rear sub-frame bushes are replaced. Some reputable suspension specialists (such as Pedders) may also have the capability for checking and/or correcting the alignment.

Should the installation of the Harrop sport differential cover be carried out in conjunction with the installation of the rear sub-frame bushes, we would strongly suggest that the sub-frame bushes are replaced prior to the installation of the differential cover. This will ensure that the sub-frame is aligned to the chassis prior to tightening the mounting bracket between the differential and the chassis.

Please refer to the last pages of this document for a guide on the sub-frame alignment procedure.

(Failure to align the sub frame assembly to the chassis could result in a misalignment between the differential and the chassis).



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EQUIPMENT REQUIRED

The tools to fit the following fasteners are required to change the conventional differential cover to the Harrop sports differential cover.

- Speed sensor retaining screws – M6 x 12, 5mm Allen head (2)
- Differential cover bolts – 5/16" UNC, 13mm hex head (8)
- Differential fill plug – 3/4" UNF, 15/16" hex head (1)
- Differential drain plug - 15mm hex head (1)
- Bracket to Cover bolts & nuts – M10 x 70, 16mm hex head (2 each)
- Chassis to Bracket – M8 x 25, 6mm Allen head or 13mm hex head (4)
- Suitable thread locking compound such as Loctite #248
- Hydraulic/Screw jack to support the differential

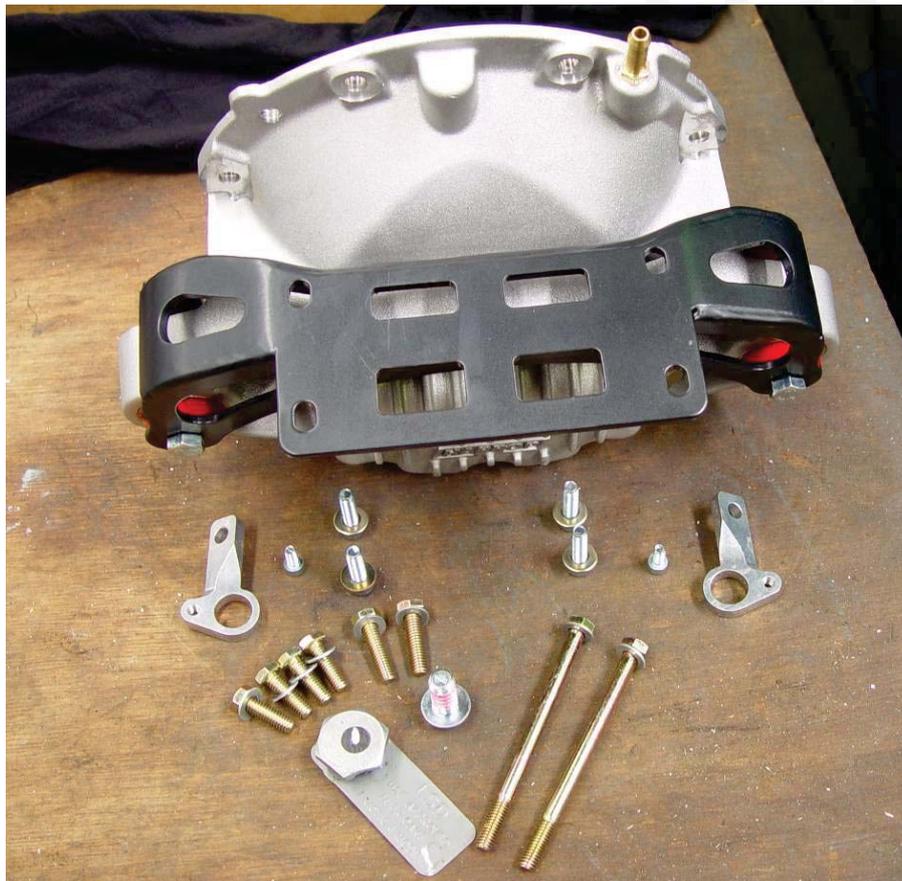
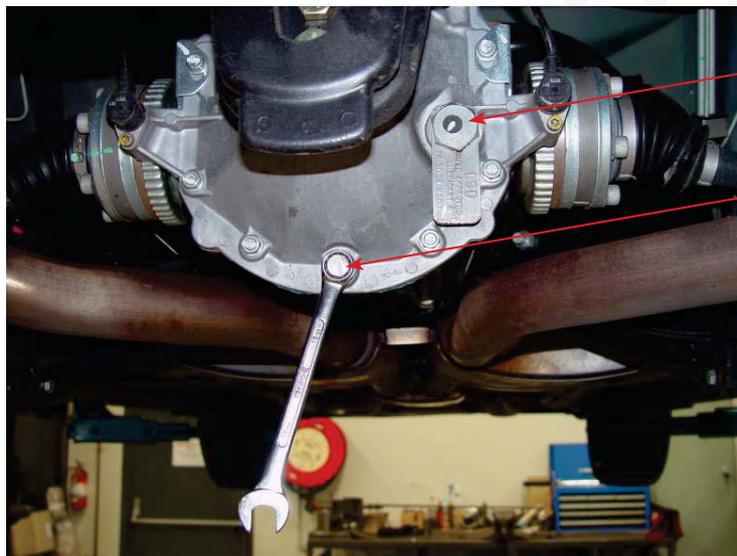


FIGURE 1: Harrop Sports Differential Cover Kit

PROCEDURE

1. Begin by allowing the vehicle sufficient time to cool down; this reduces the risk of being burnt by either the exhaust or the differential oil.
2. Raise & appropriately support the vehicle. Obtain a container of 3 liters or greater in capacity to drain the diff oil into. Remove the drain plug and allow oil to drain out completely.
 - 2.a. The plug is the 15mm head bolt located at the lowest point on the rear differential cover (as depicted below).

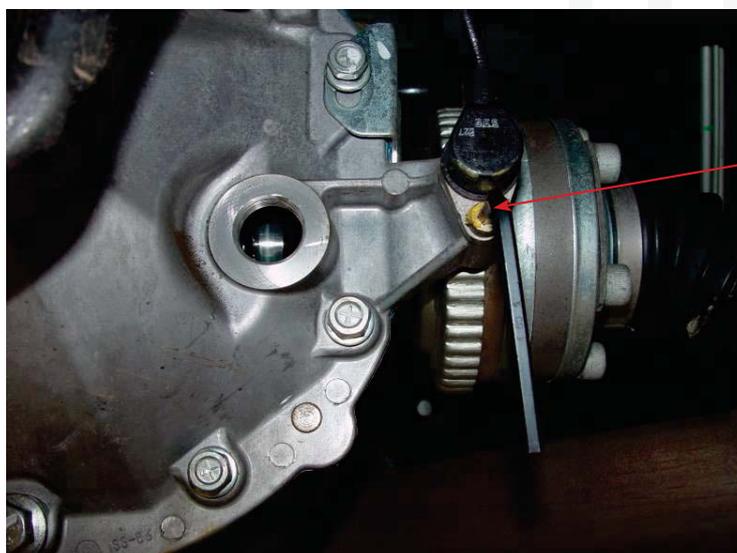


Fill plug

15mm hex head drain plug

FIGURE 2: 15mm differential drain plug being removed

3. Remove the speed sensor retaining screws on both sides of the cover as shown in figure 3 below. Slide the sensors out of the mounting holes and swing them back out the way to avoid damage.



5mm allen key used to remove speed sensor

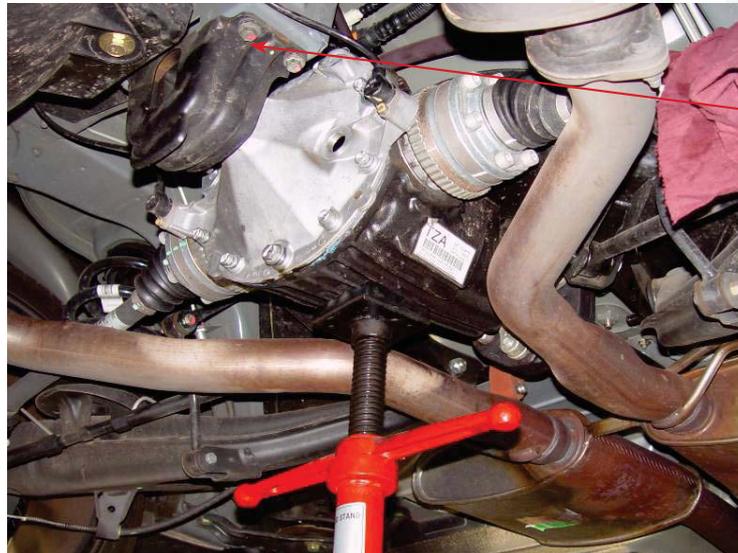
FIGURE 3: Removing the 2 speed sensors

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4. Place a screw or hydraulic jack under the differential housing, as shown in figure 4. The differential will need to be lowered, raised, and supported during the period that the mount bolts are removed.



Mounting bolts

FIGURE 4: The support stand being placed underneath the differential

5. With the screw jack adjusted & securely in place under the differential, remove the four bolts that hold the differential mount to the body.

5.a. Once those bolts have been removed, lower the screw jack until the inside CV boot just clears the exhaust pipe.

5.b. Don't rest the CV boot on the exhaust (particularly if sufficient time was not given for the vehicle to cool down).

6. Once the differential is lowered, remove the eight bolts that hold the cover.

6.a. Remove the ventilation hose attached to the top of the differential cover.

Caution: It is recommended to indicate with a permanent marker a "spot" on both the differential housing and the bearing retainers. On each side of the differential, just above the axle centreline, there are two cover bolts (one on each side) that go through the side bearing adjustment retaining brackets. Make sure that these brackets are not misplaced, and ensure that the bearing preload is not altered.



7. Two dowel pins are used to align the cover along with a sealing compound to seal the two mating surfaces.

7.a. Often the cover is difficult to remove, and as a result the cover may need to be carefully levered off the differential housing.

8. This assembly does not have a specified gasket to go between the two mating faces of the differential and the rear cover. The blue sealant shown in figure 5 is RTV sealant.

8.a. Ensure that all the old sealant is removed from the mating face before reassembly.

8.b. If the sealant is not cleaned off correctly, there will not be a good seal between the two surfaces and the differential assembly may leak, particularly when the oil gets hot.

8.c. Be sure not to get any sealant in the differential housing when cleaning mating surface.

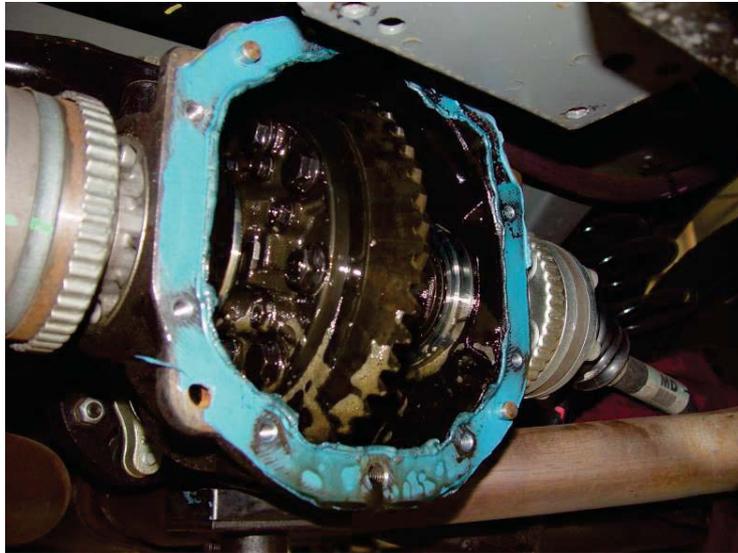


FIGURE 5: Clean the sealant from mating surface

9. Use an appropriate cleaning solvent to ensure the surface is free from residual oil/grease as shown in figure 6.



FIGURE 6: Once sealant is removed from mating face, begin reassembly

10. Apply a bead of RTV (or equivalent) silicone around the mounting surface of the diff cover, as per the silicone manufacturers instructions.

10.a. The Holden recommended sealant is Loctite 587 (HN1973)

11. Present the cover up to the diff, lining up the alignment pins with the holes in the cover, and lightly tap (if necessary) the cover on with the soft hammer.

11.a. If installing the cover to a vehicle built prior to 1998, it may be necessary to tap the dowels in so they do not protrude more than 5mm.

12. Install the new 5/16" UNC bolts that are supplied in the kit and torque them all except the two that hold on the side bearing adjustment retaining brackets.

12.a. Notice that these two bolts are 6mm longer to allow for the side bearing adjustment and speed sensor brackets, which should be placed on as the two bolts are installed.

12.b. **Caution:** Do not torque these two bolts without setting the 1mm gap between the sensor and the reluctor ring on the driveshaft.

12.c. Cover mounting bolts should be torqued to 23 – 31 Nm

13. Ensure that the side bearing alignment plates are mounted correctly and begin torquing the two 5/16" UNC bolts.

13.a. At the same time the air gap between the reluctor and the sensor should be set.

13.b. The sensor should be set at 1mm away from the outer diameter of the reluctor as shown in figure 7.

13.c. After the gap is set, torque the two remaining cover bolts.



FIGURE 7: Set 1.0mm clearance between the sensor and reluctor

14. Install the differential mounting bracket to the chassis by loosely screwing the four M8 Chassis-Bracket fasteners into the chassis to hold it in the correct place.

14.a. **Caution:** Do not reuse the bolts from the original mount these are "torque-to-yield" bolts, reusing these may result in failure.

15. Place the two M10 Bracket-Cover bolts through the bracket and differential cover as shown in figure 8.

16. Raise the differential so the bracket's mounting surface is flush with the mating surface of the chassis, then proceed to torque the two rear M8 Chassis-Bracket fasteners to attach the bracket to the chassis.

16.a. This allows the mount to centralize itself between the differential and the chassis.

16.b. Chassis-Bracket fasteners should be torqued to 30 – 35 Nm.

16.c. It is recommended to apply Loctite #242 or #248 to the fasteners.

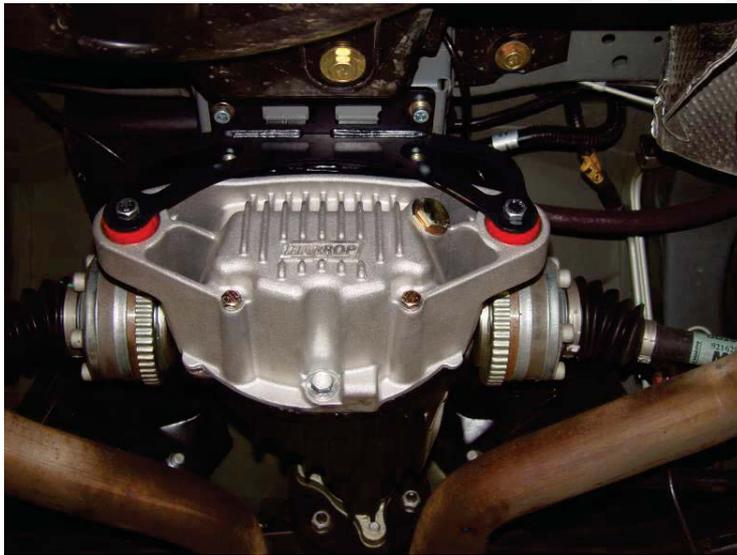


FIGURE 8: Bracket aligned and torqued

17. With the bracket firmly fixed to the chassis by the rear fasteners, remove the two M10 Bracket-Cover bolts.

17.a. Lower the differential assembly so that it is possible to tighten the front two M8 Chassis-Bracket fasteners within the bracket. Once these two fasteners are torqued, the differential can be raised into position & the two M10 Bracket-Cover bolts can be reinstalled & torqued.

17.b. Bracket-Cover bolts should be torqued to 50 – 65 Nm.

17.c. It is recommended to apply Loctite #242 or #248 to the fasteners.

18. Install the drain plug and torque.

18.a. The drain plug should be torqued to 23 - 31 Nm.

19. Fill the differential with Limited Slip Differential oil.

19.a. The differential should hold approximately 2.5 liters (or until it is level with filler plug).

20. Check for oil leaks, test drive, then re-check for leaks.

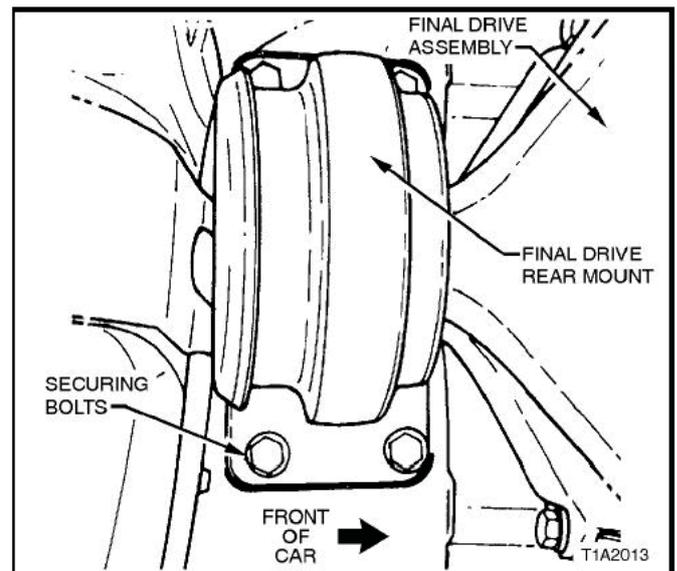
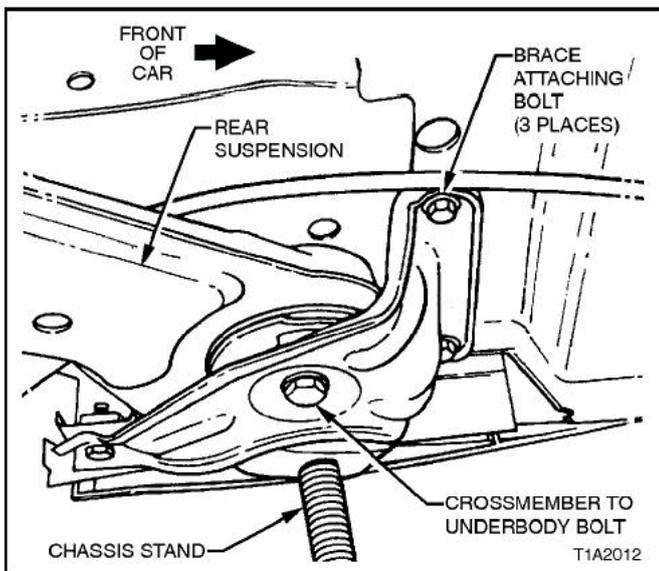
21. Enjoy.

REAR CROSS-MEMBER/SUB-FRAME ALIGNMENT

Rear suspension crossmember centering tool needs to be held in position during the alignment procedure. Therefore, assistance will be required to complete this operation.

1. Using chassis stands support vehicle at hoist pad locations.
2. Remove wheels.
3. Remove intermediate muffler and pipe assembly together with rear muffler and pipe assembly.
4. From underneath the vehicle, support final drive with a trolley jack and raise slightly to take weight off final drive mount.
5. Loosen three M10 screws securing crossmember to body brace left hand side and right hand side.
6. Loosen rear suspension crossmember attaching bolts (M14) left hand side and right hand side.
7. Loosen four bolts securing final drive rear mount.

Caution: Rear suspension crossmember attaching bolts and final drive rear mount attaching screws must be renewed after each loosening and may be replaced one at a time during the alignment procedure. Alignment of crossmember must be completed within 20 minutes from installation of new bolts. Attaching bolts are supplied with a micro encapsulated locking compound applied to threads that will start to set immediately after installation and will reach 20% adhesion after 30 minutes.



8. Fit rear suspension centering tool No. AU 458. **Note:** Rear suspension crossmember centering tool locates into $\varnothing 19$ mm body datum holes positioned forward of rear suspension crossmember.

9. With the help of an assistant, manoeuvre the rear suspension crossmember until the location pins of the rear crossmember centring tool engages the alignment holes on the rear suspension crossmember.

10. Tighten rear suspension crossmember attaching bolts (M14) left hand side and right hand side.

Rear Suspension Crossmember attaching bolts torque specification - 125 Nm, rotate 30° - 45° with a min. of 135 Nm.

11. Tighten four screws securing final drive rear mount.

Final Drive Rear Mount attaching screws torque specifications - 30-45 Nm

12. Tighten three M10 screws securing crossmember to body brace left hand side and right hand side.

Crossmember M10 securing screws torque specification - 60-85 Nm

13. Remove rear crossmember centering tool.

14. Gently lower trolley jack and remove from under vehicle.

